THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
June 22, 1987 · Vol. XXI · No. 25 · $2/Copy · $44/Year

COMPUTERWORLD

INSIDE

IBM guns for networking supremacy

Netview serves as hub of three-tiered scheme; SNA reels in 9370s

Distributed plan seen silencing criticism, blunting DEC attack

BY ELISABETH HORWITT
CW STAFF

ANALYSIS

NEW YORK — IBM last week finally delivered on its promise to provide a distributed networking architecture.

By adding much-needed communications functionality to its 9370 series processor and VM operating system, IBM laid the foundation for a three-tiered network management hierarchy based on a new release of its Netview network management software.

A large portion of last week's announcements also extended the range of systems support, flexibility and distributed capabilities of the vendor's Systems Network Architecture and of LU6.2 and PU2.1, its peer-to-peer protocols.

Another group of products were designed to enhance communications between a central Netview host and 9370s acting as target remote Netview systems that keep track of network operations at individual remote sites. The 9370 will be generally available in July, IBM said.

Complementing the communications products, IBM introduced an enhanced version of its VM/IS operating system that it said was designed for ease of use and installation at distributed 9370 and 4300 systems sites. Said to reduce or eliminate the need for systems personnel at distributed locations, VM/IS Release 5 will reportedly include a function allowing a centralized host to download new software, software changes, files and maintenance commands to multiple remote 9370 systems (see story page 97).

Netview Release 2 automates many network management tasks, putting them under control of a central host so that the

Continued on page 96

NEW YORK — IBM's deluge of communications-related announcements is more than just a return salvo fired at rivals who have used IBM's shortcomings in the networking area as a highly effective competitive weapon.

Besides filling in some crucial gaps in its own data and voice networking product line, IBM has proposed a distributed network management system — thereby greatly increasing its viability as a communications market leader.

The vendor at last released enhancements to its Systems Network Architecture communications system that were high on many MIS managers' wish lists.

More than one MIS manager was glad to hear that IBM has finally announced the capability of reconfiguring an SNA network without having to take it down. "We have had to reconfigure our

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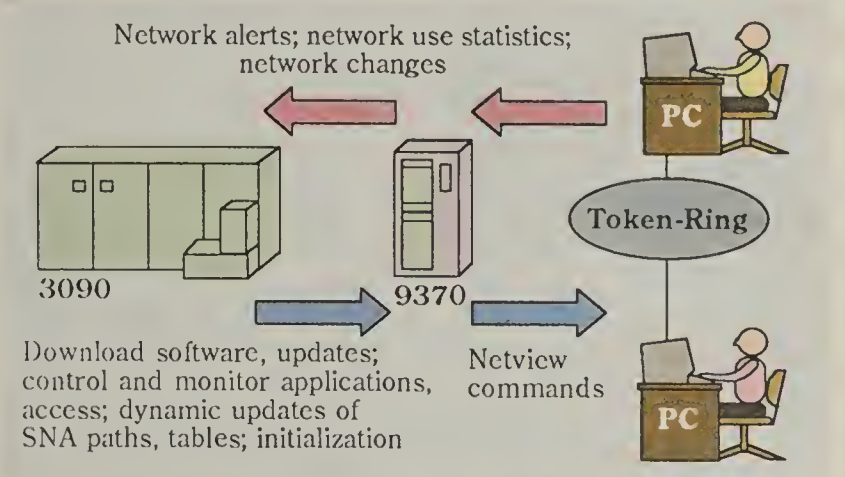
Enhancing the network
Added Netview functions provide host control of network devices



CW CHART: MITCHELL J. HAYES

See you in September 386 Windows, PC Excel

BY DOUGLAS BARNEY
and ED SCANNELL
CW STAFF

REDMOND, Wash. — Microsoft Corp. is readying a Windows blitz this September with the release of 386 Windows — a potent multitasking alternative to IBM's OS/2 for Intel Corp. 80386 users — leading the charge.

According to sources close to Microsoft, the firm will simultaneously roll out PC Excel, its long-awaited rival to Lotus Development Corp.'s 1-2-3 spreadsheet product, and ship Windows 2.0, a new version of Windows. Like 386 Windows, the update conforms to IBM's Systems Application Architecture guidelines.

Although the final price has not been set, PC Excel will sell for $395 to $495, a Microsoft source confirmed.

Microsoft will reportedly showcase the products at a special promotion in September and plans to ship both PC Excel and Windows 2.0 that month. The 386 Windows product is expected to ship within six to eight weeks of the rollout. Microsoft officials declined to comment on the unannounced products.

Sources said 386 Windows is a control program that allows an 80386-based micro to run multiple applications using the chip's 8086 virtual mode. Under 8086 virtual mode, the 80386 is able to act as if it were multiple virtual 8086 machines, with each session addressing a full 640K bytes of random-access memory.

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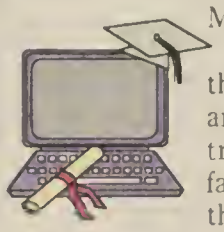
CRISIS IN EDUCATION

MIS courses fall short

BY GLENN RIFKIN
CW STAFF

This is the conclusion of a two-part series.



As the field of MIS continues to define and redefine itself, the profile of the state-of-the-art MIS professional is beginning to take shape. A successful MIS manager must combine a deep technical understanding with business and management skills to answer the corporate call for strategic advantage from information systems.

Unfortunately, that winning combination is tough to find, and American universities aren't providing enough of the well-rounded graduates that MIS shops need, according to a *Computerworld* survey of more than 700 MIS executives.

MIS programs at the country's colleges are struggling to attract students, and the falloff in the promise of these once-burgeoning concentrations is beginning to impact MIS departments.

"There is simply a shortage of good, young talent out there," says Warren Harkness, MIS director at Bose Corp. in Framingham, Mass.,

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IN THIS ISSUE

DEC winds up. DEC's ammunition in the low-end engineering workstation battle includes a new 32-bit color workstation and a reduced-price Vaxstation 2000; on the micro front, its PC Network Integration Package allows PC-to-VAX communications. Page 6.
NCC winds down. In the limelight at NCC were laser printers from Xerox, Fujitsu Winchester drives for the high-end PC market, Nestar low-end LANS and interface card and Northern Telecom's enhanced Meridian Lanstar PC. Pages 14, 15.

NEWS

SOFTWARE & SERVICES

The evolving impact printer. Center pullout section.

MICROCOMPUTING

NETWORKING

SYSTEMS & PERIPHERALS

Quotable

"The 9370 came out of the box naked as a baby; now it's starting to grow up and sprouting software in the process."

FRANK DZUBECK
COMMUNICATIONS NETWORK ARCHITECTS, INC.

MANAGEMENT

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EMPLOYMENT TODAY

SPOTLIGHT

IN DEPTH

OPINION & ANALYSIS

DEPARTMENTS

N E W S

High-tech won't cut jobs

Study says it will boost employment, wages

BY MITCH BETTS
CW STAFF

CHICAGO — Office information systems, computer-integrated manufacturing and other technologies in the U.S. workplace will not cause major increases in unemployment, according to a National Academy of Sciences report released last week.

Although individuals "will face painful and costly adjustments," the blue-ribbon panel said, automation is essential for the economic growth that will boost overall employment and wages.

In a competitive world market, rapid adoption of new technologies will create less unemployment than slow adoption of the same technologies, the panel said in its report, "Technology and Employment."

The committee included economists, sociologists, educators and representatives of industry and organized labor. It was chaired by Richard M. Cyert, president of Carnegie-Mellon University. The two-year study was funded by the U.S. departments of Labor and Commerce, the AFL-CIO, several corporations and foundations and members of the computer industry.

"Rather than producing mass unemployment, technological change will make its maximum contribution to higher living standards, wages and employment levels if appropriate public and private policies are adopted to support the adjustment to new technologies," the study concluded.

Keep work force informed

To help workers adjust to technological change, the panel recommended that displaced workers be offered federal job placement and training programs and receive substantial advance notice of impending layoffs or plant closings.

Furthermore, the report said that business managers should consult with employees about any planned technological change.

The Computer and Business Equipment Manufacturers Association (CBEMA) in Washington, D.C., issued a statement strongly opposing the study's support of a federal requirement that employees be given substantial advance notice of plant closings or major layoffs.

Although CBEMA provided partial funding for the study and supported the general thrust of the report, it opposed the recommendation for government-mandated advance notice.

CBEMA officials said they fear it will sway votes in the Senate for a union-backed bill implementing the recommendation.

MSA targets mid-range manufacturing market

BY ROSEMARY HAMILTON
CW STAFF

ATLANTA — Management Science America, Inc. (MSA) will take a shot at the IBM-dominated mid-range manufacturing market with the expected announcement tomorrow of an integrated software package.

The vendor is slated to introduce Advanced Manufacturing Application Product Suite (AMAPS) 36/38 along with several other products at the Advanced Manufacturing Systems conference, which begins today in Chicago.

AMAPS 36/38, designed to run on the IBM mid-range System/36 and 38, will go up against the IBM Manufacturing, Accounting and Production Information Control System, which has a lock on more than 70% of this market, according to Alice Greene, an analyst at International Data Corp. in Framingham, Mass. Of the 14,570 manufacturing software licenses installed for System/36 and 38 hardware by the end of last year, 11,500 belonged to IBM, Greene added.

MSA also announced it is porting its manufacturing system for the Hewlett-Packard Co. 3000 series minicomputer to the HP Spectrum series, a reduced instruction set computing system.

It is slated to be available in the fourth quarter, according to Joseph Southworth, vice-president of marketing for MSA Advanced Manufacturing, Inc.

AMAPS 36/38 is a modified version of the mid-range system from RTS Ltd., an Ireland-based company that MSA acquired last year.

The system, which consists of 12 modules, is a manufacturing resource planning-based package said to include applications for distribution, sales forecasting, order processing, purchasing and on-line receivables.

Modules are purchased individually, with prices ranging from $12,000 to $20,000 per module, Southworth said.

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OSI draft standard out months early

BY DONNA RAIMONDI
CW STAFF

An International Standards Organization (ISO) subcommittee that has been meeting in Tokyo for the past two weeks has issued a draft international standard (DIS) for managing and monitoring network resources months before the standard was expected, according to participants.

Although the standard is now set, the ISO must hold future meetings to amplify and approve each part of the standard, such as port management and network error thresholds, participants said.

The Open Systems Interconnect (OSI) systems management standard refers to the control and monitoring of the use of network resources such as data storage, processors and interconnection devices on one or multiple layers of the OSI model. It will also specify accounting, configuration, name, performance and security management functions.

The DIS status of OSI network management means that the standard is stable, said Trudy Reusser, standards engineer at Hewlett-Packard Co. and the earliest proponent of OSI standards. "Only minor inconsistencies can be changed at this point," she said.

Vendors' support

So far, the fledgling standard has the support of numerous computer manufacturers, including IBM, Digital Equipment Corp. and HP. The standards will be different from anything the vendors are using as network management at this point, Reusser said.

"There are no de facto standards in network management today. There are only de facto ways of doing things. Just about all of the major companies are committed to OSI network management standards for the future," she said.

Four hundred people in five working groups waded through three dozen standards during the recent convocation. In addition to the network management subcommittee, other groups focused on OSI architecture and extensions to it; how to handle data bases; specific application services; and session presentation and common application services, according to Richard DesJardins, chairman of the committee and a system engineer for Computer Technology Associates, a Denver system engineering house for military applications.

The ISO network management subcommittee's standards are important because network users are concerned about the reliability, availability and security of their networks, said Yoshikazu Kobayashi, chief of the ISO working group on OSI systems management and senior standards planner at IBM Japan Ltd.

A DEC spokeswoman said her company supports the areas under consideration. "Few of the protocols have been approved. OSI has defined the areas that need to be addressed, such as fault detection, performance [and] allocation accounting. But it's a lot of work to define and approve protocols," she added.

Lori Valigra, Tokyo correspondent of the IDG News Service, assisted in the preparation of this report.

The new standards team

BY LORI VALIGRA
SPECIAL TO CW

TOKYO — The International Standards Organization (ISO) and the International Electrotechnical Commission (IEC), two international standards groups based in Geneva, have agreed to collaborate in defining international information technology standards.

The organization they have formed, called the Joint Technical Committee 1 (JTC1), has scheduled its first plenary meeting here in November.

Richard DesJardins, chairman of the ISO/TC97/SC21 committee that yesterday concluded meetings that began here May 28, said the collaboration was one of the major outcomes of this round of ISO meetings.

"The JTC1 meeting will be like a summit meeting," he said.

"It is an important collaboration because it means coordination among all the standards bodies." Other standards groups have to comply with standards set by the IEC.

VM high-end intro applauded

But users' doubts about system delivery date remain

BY ROSEMARY HAMILTON
CW STAFF

VM users last week welcomed the recent enhancement to IBM's VM/XA SP, which they said will bring them a long-awaited end-user-oriented high-end operating system, although some skepticism emerged regarding the vendor's ability to deliver radically different functionality on time.

"If it's what they say it is, then it's what I've been waiting for." said Percy Irani, computer-aided-design supervisor at Advanced Micro Devices, Inc., which runs the current VM high-end — VM/XA SF — on an IBM 3090 Model 200. "If it's really there, then I'll jump on the bandwagon."

The first release of VM/XA SP is expected in March 1988. Of the many new features, users pointed to the enhanced Conversational Monitor System (CMS), the expansion of preferred-guest support from one to four and the native Systems Network Architecture (SNA) support as key elements. The SNA support is not scheduled to be available until the first quarter of 1989.

A user at Carter Hawley Hale Stores, Inc. said his facility is interested in VM/XA SP because VM usage is growing at a much higher rate than MVS.

"We're looking at expert system applications and computer-aided-design applications, so our VM system will grow much faster," said Roy Chang, manager of software and product support at Carter Hawley Hale's information services division.

VM/XA SF not suitable

Both applications, Chang said, would require an interactive environment that CMS provides. But the current VM/XA SF does not provide a fully functional CMS. To currently achieve that on a high-end system, Chang said "you would have to run another VM under VM/XA, which is a very, very awkward and expensive approach. We looked into SF and realized we couldn't afford that overhead."

Irani also said the new CMS portion of VM/XA SP would be useful at his facility, which needs a high-end system-interactive environment to run simulations for semiconductor chip design.

Because there is no such high-end VM available, Irani's facility opted for a batch environment to run the simulations. However, he said his company decided not to use MVS "because the maintenance overhead is tremendous." The remaining option was to run VM/XA SF on the 3090 and modify its batch environment to suit Advanced Micro Devices' simulation needs. The project took three man-months, Irani said, but proved to be a less costly approach because "we can maintain the VM system with three people, but we'd need five to 10 to run MVS."

Because VM/XA SP represents a major improvement over the current VM/XA offering, some users said they are concerned that IBM will not be able to provide all this functionality according to its schedule.

"My reaction [to VM/XA SP] is I wouldn't say anything until it's been out there for a while," said James Bur, manager of technical support at Jervis B. Webb, a materials handling firm in Farmington Hills, Mich. "They say it is a true 31-bit CMS, but after 17 years of experience with IBM, I'm just not going to buy that."

The James River Corp. of Virginia, a paper manufacturer in Richmond, decided to not just "get by" with the VM/XA SF offering and to wait for the full-fledged version instead, said Brad Harris, a senior systems programmer. VM/SP is running on its 4381, and Harris said the company will move to VM/SP High Performance Option 4.2 this week.

Harris said his main concern is that the native SNA support won't be available for nearly two years. "That toned [the announcement] down a bit, but at least they're headed in the right direction."

CORRECTIONS

VM/XA SF is not included in IBM's graduated pricing structure [CW, June 15]. It has an initial license charge of $11,220 with subsequent monthly fees of $3,740.

The revised stock trading indexes [CW, June 8] each reflect a historical base of 100 on June 2, 1986. The indexes track relative stock performance since that date.

The Soft Talk column on distributed data bases [CW, May 25] was written by Tom O'Flaherty, who is the director of research for Broadview Associates, a merger and acquisition firm in Fort Lee, N.J.

In a letter to the editor, "Making MRP sense" [CW, June 15], Donald Frank was referring to MRP by contract systems and MRP by contract software.

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DEC gets jump on Sun, Apollo in low-end race

BY ROSEMARY HAMILTON
CW STAFF

Digital Equipment Corp. last week set the stage for what is expected to be an intensely competitive battle at the low end of the engineering workstation market with a product rollout that includes the lowest prices in that business.

Meanwhile, both Sun Microsystems, Inc. and Apollo Computer, Inc. have new low-end models waiting in the wings, industry analysts said. Sun, which two months ago cut its low-end monochrome system to $4,995 from $7,900, has scheduled a product announcement for July 7, which analysts said may bring a low-end system based on an Intel Corp. 80386 microprocessor.

All three vendors, analysts added, are attempting to push back the enchroachment of microcomputers into their territory while also making a move into what has traditionally been personal computer turf.

DEC's announcement last week included a $7,900 32-bit color workstation, the first color model in the workstation industry to be priced at less than $8,000. The vendor slashed its Vaxstation 2000 with a 19-in. monochrome monitor to $5,400 from $10,500. The $4,600 Vaxstation 2000 with a 15-in. monitor was also introduced.

"At $5,000, DEC has something with better performance and more software than the [IBM] Personal System/2," said Michael Orsak, an analyst with Robertson, Colman & Stephens in San Francisco.

DEC maintained that the Vaxstation 2000, which it began shipping in March, represents a "substantial portion" of overall Vaxstation sales, but industry analysts suggested otherwise. Vicki Brown, an analyst with International Data Corp., a market research firm in Framingham, Mass., said approximately 300 Vaxstation 2000s have been shipped each month. "Compared with Apollo, which is shipping about 2000 workstations a month, about 90% of which are its low end, that's not good," she said.

With the exception of the 19-in. color Vaxstation 2000, the new models will be shipping in December, the vendor said. That 19-in. color model is scheduled to be available in October. Along with the workstation offerings, DEC doubled the disk storage capacity for the systems by introducing a 159M-byte Winchester disk drive that is currently available for $6,900.

The vendor also doubled the capacity of its Local Area Vaxcluster from 14 nodes to 28 nodes and added a server product, a repackaged Microvax II that will sell for $65,000.

Licenses for the new Local Area Vaxcluster, scheduled for availability next month, are included with Vaxstation 2000 and Vaxserver products, a spokesman said. If users wish to use other VAX systems as boot nodes on the cluster — a requirement to attain 28-node capacity — a license fee is charged for each system.

Other major workstation vendors seem to be pursuing strategies similar to DEC's. The aggressive pricing is an attempt by workstation vendors to move into what has traditionally been personal computer terrority while there is a so-called window of opportunity, industry analysts said. By lowering prices, workstation vendors can fill a void that exists until IBM's PS/2, complete with Microsoft Corp.'s MS OS/2, is available next year.

At Apollo, Michael Gallup, vice-president of marketing, said engineering workstation vendors currently have the advantage over microcomputer vendors. "We are moving into their environment in terms of pricing, and they are moving into ours by adding functionality," he said.

Richard Shaffer, a principal at the Technologic Partners, a New York consulting firm, said he expects "very intense competition a year from now, as PCs go after the technical market and workstations go after the [Microsoft] MS-DOS kingdom."

Downhill racers
Entry-level prices of low-end workstations have dipped dramatically in one year to face off against high-end PCs

	June 1986	July	August	September	October	November	December	January 1987	February	March	April	June
DEC Vaxstation 2000									$10,500			$5,400
Sun 3/50M	$7,900											$4,995
Apollo DN3000	$9,900											$9,900
IBM RT PC 6151 Model 10	$11,700											$7,900
PS/2 Models 60												$5,295
PS/2 Models 80												$6,995
HP	$15,600 (320M)											$12,700 (330M)* $7,800 (318M)**

* HP 330M replaced 320M in March
** 318M added as low-end machine in May

CW CHART

PC-VAX link arrives

Part of DEC plan for broad IBM connectivity

BY ED SCANNELL
CW STAFF

LITTLETON, Mass. — Digital Equipment Corp.'s microcomputer strategy continued to slowly unfold last week as the company finally delivered its IBM Personal Computer Network Integration Package, which allows users of IBM PCs and compatibles to communicate with the DEC's VAX, Microvax and Vaxmate computers.

DEC, as well as many users and analysts, said it sees the program as central to its success in extending its proprietary architecture to IBM-dominated environments and providing its largest customers with an all-DEC line of hardware and software.

However, DEC continues to experience delays in delivering its PC-oriented products and is reportedly suffering slow sales of the highly touted Vaxmate, a PC AT compatible. The results have some observers wondering whether DEC will make a serious commitment to the PC-compatible market.

Announced in September 1986, DEC said it had hoped to ship the Network Integration Package sometime during this year's first quarter. However, the program's testing and evaluation cycle lasted longer than expected, according to George Symula, manager of DEC's personal computing program.

"We wanted to certify the product as providing the same capability to the IBM desktop that it provides to the Vaxmate," Symula said. "It is not a simple matter of connecting a PC into a PC LAN, which is what most of our competitors do."

One source close to DEC said that the delay centered around DEC figuring out a way around the incompatibilities between Decnet drivers and Ethernet-compatible boards. "The program kept crashing, and DEC was forced to do something proprietary," the source said.

Yet corporations with substantial investments in both DEC and IBM hardware appear to be glad to see the Network Integration Package arrive. "It is pretty important to us to make a PC work like a Vaxmate because we have a lot of IBM PCs around," said Peter Duray, project manager in Polaroid Corp.'s corporate MIS department. "I just wish we got it sooner."

The Network Integration Package shipping delay is the second stumble DEC has made this year in trying to launch its microcomputer strategy. Early this year, the company had engineering and manufacturing problems with the Vaxmate's expansion unit, problems the company said it has corrected.

Some analysts said DEC has not implemented an effective micro strategy yet because it is more committed to pushing its advantage in the VAX market. "They [DEC] look at their bottom line and see VAXs," said John McCarthy, an analyst with Forrester Research, Inc. "They aren't plugged into the dynamics of the PC market."

McCarthy and other analysts pointed to DEC's sharp reduction last week in the price of the Vaxstation 2000, a desktop workstation that runs DEC's VMS operating system, as evidence of its lukewarm commitment to PCs (see story above). "I don't know if DEC has a full-court press on its PC products," said Marty Gruhn, vice-president of The Sierra Group. "I think it's DEC's long-term strategy to offer PC-type applications at the server level and run them in a window on that [Vaxstation 2000] workstation."

DEC's Symula said the Vaxstation price cuts do not signal that the product is being positioned against IBM and compatible micros. He said the company remains committed to its "dual strategy of extending DEC's architecture into the DOS world and pushing its proprietary strategy."

Corporate AT purchases slow with entry of PS/2, end of XT

BY DAVID BRIGHT
CW STAFF

The advent of IBM's Personal System/2 architecture and better buys on IBM Personal Computer AT-compatible systems have prompted some large corporations to reduce AT purchases since the PS/2 was introduced April 2, a spot check of several corporate MIS managers suggested last week.

IBM has stopped taking orders for most of its PC XT systems [CW, June 8], and many managers said they fear a similar scenario will soon occur with the AT. With that possibility in mind, a significant portion of managers are either moving to the PS/2 architecture or buying AT-compatible machines, which they said offer better price/performance ratios and are likely to be around longer than the AT.

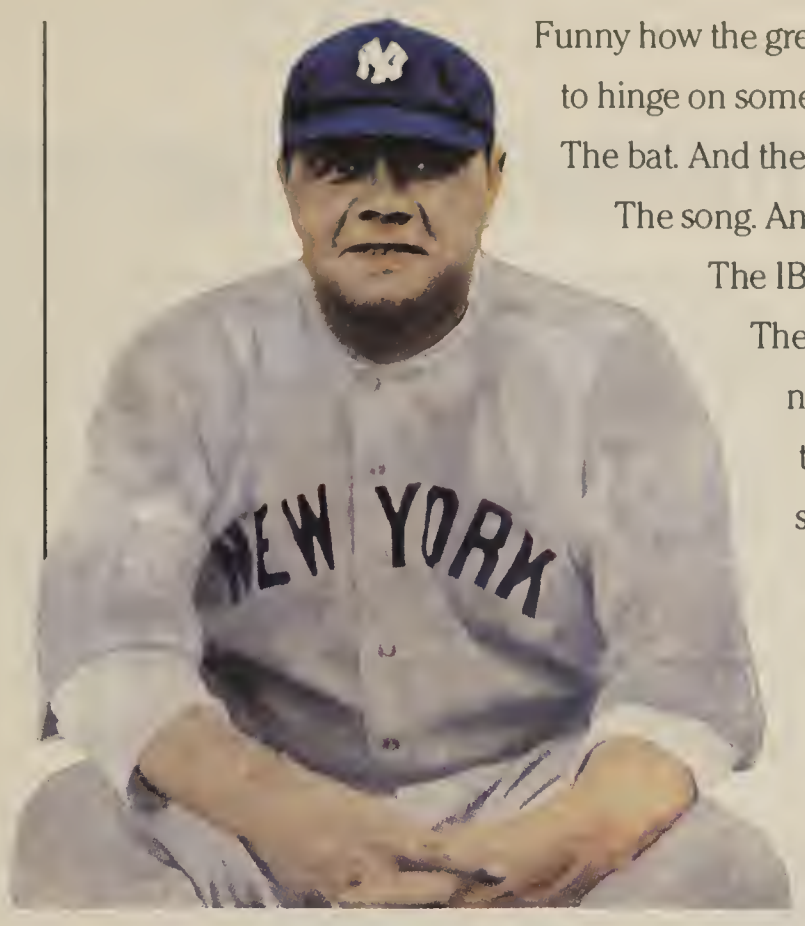
Of 16 managers polled by *Computerworld* in a telephone survey, nine said they have been buying fewer ATs than before the announcement, while five said their purchasing patterns have not changed. Only one respondent said he has increased AT purchases. One manager said he stopped buying ATs before the PS/2s were announced.

Eaton Corp., based in Cleveland, has virtually stopped buying ATs and, instead, will go with the PS/2 and AT-compatible machines from Compaq Computer Corp., said Fred Zickert, manager of personal computers. Zickert said the decision to acquire PS/2s was made after a careful comparison of the price/performance ratios of the PS/2 and AT. At the same time, Eaton has increased its orders of Compaq systems, Zickert said.

"We've pretty much stopped buying ATs," said Jeffrey Mahoney, data processing manager at SCM Office Supplies Group in Marion, Ind. "We'll wait to see what the PS/2 has to offer."

This wait-and-see attitude is a common strategy at many corporations that have decided to cut back on AT purchases but, at the same time, want to make sure the PS/2 is proven before they buy in quantity.

Scott Paper Co.'s Marinette, Wis., operation has begun buying AST Research, Inc. Premium/286 systems as an alternative to the AT. Ronald Renk, manager of information services, said that policy will remain in effect "for the near and immediate future" while he monitors the progress of the PS/2.



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IBM, Cincom DBMS favorites

BY CHARLES BABCOCK
CW STAFF

Market share figures for prominent mainframe data base management systems indicate a decided shift toward relational products, but in many cases, the relational DBMS serves in a secondary capacity to an existing DBMS, two market research firms say.

"Relational data base management systems are clearly being targeted by users into sites where they have existing DBMS experience," says John D. Worthen, president of Focus Research Systems, Inc., a West Hartford, Conn.-based market research firm.

The major winner is IBM with DB2 and SQL/DS relational products, according to figures released by Focus Research and International Data Corp. (IDC) in Framingham, Mass. Another beneficiary of the trend is Cincom Systems, Inc. in Cincinnati, the maker of the Supra relational system. And Oracle Corp.'s Oracle is beginning to show up in buying-intention surveys.

A number of hierarchical, networked or inverted list products are suffering a decline in sales, the figures show. IDMS/R from Cullinet Software, Inc., Adabas from Software AG of North America, Inc. and Datacom/DB from Applied Data Research, Inc. (ADR) show sharp drop-offs in sales, according to IDC, although the vendors say the decline is not that severe.

In addition, Focus Research surveys of buying intentions show DB2, SQL/DS, Oracle and Supra account for nearly 50% of this year's market, compared with results for nine other products on the market.

"The independents are reeling," says IDC research analyst Peter L. Burris.

About 80% of the appetite for relational products is coming from existing DBMS users. About 60% of the intended buyers of traditional systems are first-time DBMS users, Worthen notes.

Burris's figures indicate that IBM shipped 850 copies of DB2 in 1986, a 240% increase from 1985, and 800 copies of SQL/DS, a 133% jump.

In contrast, Software AG shipped 100 copies of Adabas in 1986, a 45% decline in sales; Cullinet shipped 100 copies of IDMS/R, a 78% drop and ADR shipped 70 units of Datacom/DB, a 70% decline, the IDC figures indicate. ADR spokesmen immediately challenged the figures, saying 120 licenses for Datacom/DB were sold in the U.S. in 1986.

Burris says the figures represent estimated sales based on reported revenue and acknowledges he had difficulty arriving at a revenue figure for ADR now that it is part of Ameritech Corp.

"We had a drop-off, but it wasn't any 70%," said Stephen Gerrard, an ADR vice-president. Revenue was nearly identical for 1985 and 1986, he said.

Cincom President Dennis Yablonsky, whose privately held firm also does not report revenue, says IDC's figures of 100 units for Supra's first year of sales were close to actual results.

Held its own

One independent, in addition to Cincom, appeared to have held its own in spite of the relational onslaught. Computer Corp. of America held even with 86 units of its Model 204 shipped.

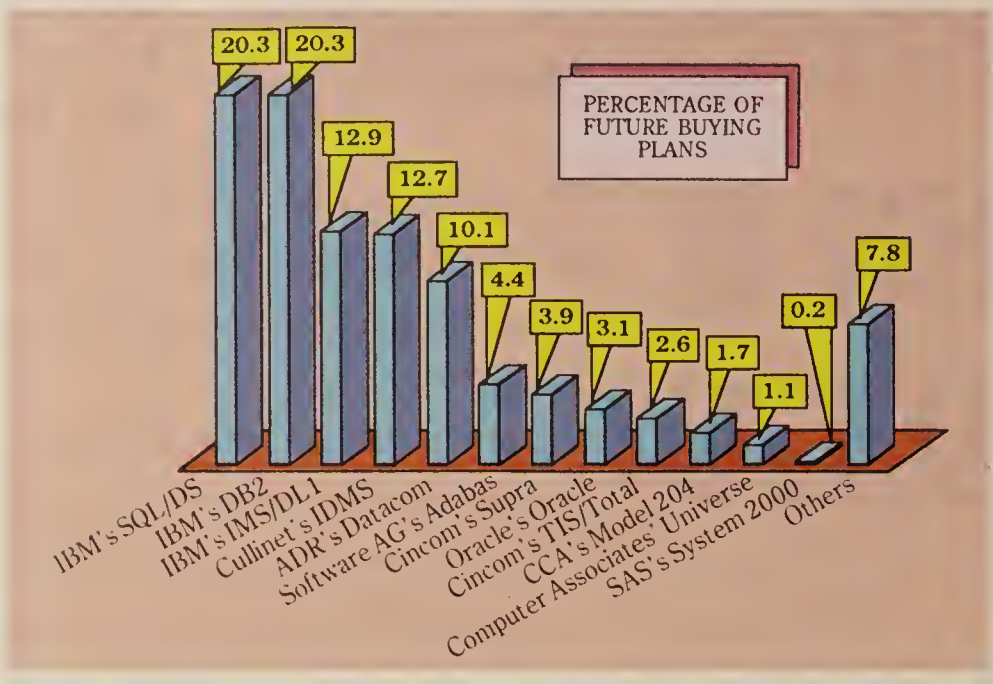
IDC's figures were reinforced by buying-intention surveys conducted by Focus Research.

The surveys showed that 20.3% of the respondents were considering purchasing DB2 this year, another 20.3% were considering purchasing SQL/DS and 3.9% were considering Supra.

Only 12.7% were considering IDMS/R, 10.1% Datacom/DB, 4.4% Adabas and 2.6% Cincom's aging TIS/Total DBMS.

Data base demands

A 1986 survey of future buying plans indicates users at 15,000 mainframe sites see wide range of options



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

Race on to be first with PS/2 chip set

BY ED SCANNELL
CW STAFF

George Morrow, former chairman of Morrow Designs, Inc., once said you could tell who the pioneers in the computer industry were by the arrows in their chests — a good-natured warning that it doesn't always pay to be first to market with a new technology.

Well, those at Chips and Technologies, Inc. must be wearing flak jackets these days because they appear to be without trepidation in their ambition to be the first to market with a chip set that fully supports IBM's Personal System/2.

"We equate being first with recognition and real dollars," said Dado Banatao, vice-president and general manager of Chips and Technologies' systems logic division. "If you are first, you can gain more than 50% of a market. It is difficult to displace someone that comes out first."

Chips and Technologies will have several competitors, of course, most notably Zymos Corp. Both companies plan to announce PS/2-compatible products that will allow compatible makers to produce PS/2 workalikes late this year and deliver them early next year.

Emulating the 'unclonable'

Both firm's goals include emulation of the controversial IBM Micro Channel architecture that some have called unclonable due to IBM patent protection and a complex design.

If they are successful, next year should see a raft of PS/2 clones brought to market by a number of vendors both from the U.S. and abroad. Taken together, the two firms provide chip sets to nearly every major IBM compatible maker. Chips and Technologies caters to higher end compatible makers such as Zenith Data Systems, while Zymos focuses on lower end clone makers, some of which are offshore.

"The level of interest among compatible manufacturers, both in this country and in the Far East, is high," said Bob Andrews of Zymos.

Helping, hurting IBM

The efforts of Zymos and Chips and Technologies will both help and hurt IBM. The existence of PS/2 clones should help establish the new IBM architecture as a standard. However, PS/2 clones are expected to offer either lower price or added features, which will create competition for the IBM line, some observers say.

Andrews said Zymos has not approached IBM about licensing the Micro Channel architecture although it is considering submitting its implementation to IBM for approval.

He said he does not anticipate any problems because of the company's technological approach to the design.

"We don't use gate arrays. We are a standard cell house," Andrews said.

The technological challenge for both companies in emulating systems like the PS/2 is growing greater. These companies must now broaden their scope to better understand systems design.

"Chips started as a semiconductor company that specialized in integrated-circuit designs," Banatao said. "But systems integration is now the name of the game," he added.

As part of that, chip makers now must give more consideration to designing more modular systems to increase performance because it makes it easier to implement performance enhancements, Banatao said.

"With a modular design, you can put in a new feature without having to redesign the whole system. And if you look at what IBM did with the PS/2, there is certainly some room for optimization," Banatao said.

Both Andrews and Banatao think many compatible makers will want to integrate their firms' respective products into systems using the PS/2 architecture. They claim their products will permit users to run applications on both architectures without any performance degradation.

386 Windows

FROM PAGE 1

"The chip itself is capable of running 16 8086 sessions and keeping them all separate," a source close to Microsoft said.

The 386 Windows package will allow non-Windows-based applications to run simultaneously. Quarterdeck Office Systems offers Desqview 1.3, a character-based 386 control program with similar features.

Some developers said they believe 386 Windows will serve as more than an interim solution to OS/2, the multitasking operating system developed by IBM and Microsoft and expected for release next year. They point out that 386 Windows allows users to multitask existing applications now without the disruption many expect OS/2 to cause.

In addition, 386 Windows reportedly provides the ability to use more than 640K bytes of memory for programs and data through the "bank-switching" techniques of the Lotus/Intel/Microsoft Expanded Memory Specification.

While no price has been set, sources said they would be surprised if the product were priced significantly higher than the current version of Windows, which sells for $100. "The changes [to Windows] don't warrant major price changes. Besides, many customers won't appreciate those changes," one source said. The Microsoft source said, however, that 386 Windows would cost more than current Windows but less than $300.

Compaq Computer Corp and Tandy Corp. reportedly have expressed a strong interest in 386 Windows.

Like a Macintosh

PC Excel, according to sources who have seen the product, is nearly identical to Microsoft's popular Apple Computer Corp. Macintosh version and will compete mainly with Lotus's market-leading 1-2-3. Unlike 1-2-3, however, which is character-based, PC Excel reportedly will run under Microsoft's Windows 2.0 graphics user interface.

While a mouse is not required to run PC Excel, it is strongly recommended. Users must also have graphics capability, such as IBM's Color Graphics Adapter or Enhanced Graphics Adapter, in order to run the product.

PC Excel allows multiple spreadsheets to be active at the same time and to be easily linked together. The product also contains a function that records keystrokes and mouse movements to automatically create macros.

Windows 2.0, which the company said will be priced at $99, is compatible with existing Windows applications but includes a new visual interface that looks the same as the one used by Microsoft's Presentation Manager.

DB2 tool leads Andersen market debut

BY CHARLES BABCOCK
CW STAFF

CHICAGO — Arthur Andersen & Co., the Big Eight accounting firm that employs 9,000 programmers, is expected to make its entry into the software business today with an announcement of a system to be used for developing applications for IBM's DB2.

The system, called Foundation, will be the first software product marketed by the firm. In the past, the company has sold two of the three modules that make up Foundation as products to its existing clients, but the firm has not offered them on the open market.

"Software engineering is not something we started yesterday," said Melvyn E. Bergstein, a managing director of Arthur Andersen's Management Information Consulting Practice. "But we have never aggressively marketed our products in the past."

Scheduled for fourth-quarter availability, Foundation was designed to build transaction-oriented applications to run with DB2. It is based on an active design dictionary that is used to tie together the early phases of software analysis and design, said Glover Ferguson, director of the firm's Productivity Practice.

The design dictionary is backed up by an implementation dictionary using DB2 tables. Data types, screen definitions, program definitions, DB2 table spaces and table definitions can be transferred from the design dictionary to the implementation dictionary in order to install and maintain an application, Ferguson said.

Bergstein said Foundation is an outgrowth of the Big Eight accounting firm's own business practice. Its integration features surpass those of stand-alone tools that cannot share data across different phases of the development process, he claimed.

The first two modules, Method/1 and Design/1, already existed but have been enhanced to go into the Foundation package along with a new third module, Install/1.

Method/1, a software life cycle development methodology, now supports installation of packaged software, iterative development and project management. It also allows the presentation of the methodology on a workstation rather than relying on paper documents, Ferguson said. The module is priced at $50,000 for a single site.

Design/1 is a personal computer local-area network environment that allows analysts and designers to share designs, including both text and diagrams. It is priced at $7,000 for the first site and $43,000 for a site with 40 users.

Install/1 costs $200,000 for a single site and is said to provide a layered architecture that exploits the characteristics of IBM's DB2, MVS/XA, CICS and VS Cobol II. The package is said to aid in screen and dialog design.

Senior Editor Clinton Wilder contributed to this report.

AT&T unveils long-awaited 80386 Unix

BY ELISABETH HORWITT
CW STAFF

MORRISTOWN, N.J. — AT&T last week released the long-awaited Intel Corp. 80386-based version of its Unix System V, Release 3 operating system.

As a multitasking, multiuser operating system, the new Unix System V/386 "can tap the full 32-bit potential of the 80386 chip," said William O'Shea, executive director of Information Technology Development at AT&T.

It is not a commercial package but a source code that will be sold to 80386-based system vendors, AT&T spokesman Barry Campbell said.

One-of-a-kind

Scheduled for shipment next month, Unix V/386 is the only available 386-based Unix product that includes Unix System V, Release 3 communications features such as remote file-sharing distributed-file system and the Streams application-to-network interface, according to the company.

The product was developed under contract to AT&T by Santa Monica, Calif., software company Interactive Systems Corp.

Interactive Systems will also be offering its own object-code version of the product, "with our own drivers and other added goodies," in July, according to Interactive Systems Vice-President Bernard Hill.

AT&T and Microsoft Corp. are both said to be working on an updated version of Unix V/386, which is scheduled for availability next year, that will support Microsoft's Xenix as well as Unix system applications.

Server links PC nets, high-end systems

BY ELISABETH HORWITT
CW STAFF

MOUNTAIN VIEW, Calif. — Bridge Communications, Inc. is expected to introduce tomorrow an intelligent communications server that reportedly will integrate departmental IBM Personal Computer networks with the resources and functionality of high-end corporate systems.

"Before, there were two markets: PC local-area networks that were bought under the table by individual departments, and products such as ours, which were sold to MIS and networked an average of 250 users at the corporate level," said Bridge President William Carrico.

Bridge's Personal Communications Server/1 (PCS/1) is targeted at departments "for whom that distinction is fading, where MIS wants PC LANs to participate as full members in the corporate network," Carrico added.

Personal Computers and compatibles equipped with a PCS/1 can access PC LAN resources via IBM's Netbios protocols and asynchronous and IBM hosts and on asynchronous hosts via Transmission Control Protocol/Internet Protocol, Bridge said. The PCS/1 also supports network management capabilities through an interface with Bridge's recently announced Network Control Server/AT.

The PCS/1 addresses "all four functions that corporate PC users need to take advantage of the resources available on a corporate LAN," commented Keith Cheney, Bridge product line manager. These include asynchronous terminal emulation, IBM 3270 PC emulation, file transfer between PCs and hosts and access to PC LAN servers and applications, he said.

Bridge said it has made its Application Program Interface specification available free of charge to third-party software developers and users to encourage them to write communications applications to run on the server. Bridge has validated asynchronous terminal emulation packages from several vendors, including Persoft, Inc., Walker, Richer and Quinn, Inc. and Softronics, Inc. Bridge provides its own 3270 PC emulation program for the server, which works in conjunction with its CS/1-Systems Network Architecture IBM host server.

Bridge said the PCS/1 supports Netbios-compatible PC LANs as well as LAN-to-mainframe communications software such as Digital Communications Associates, Inc.'s Irmalan and CXI, Inc.'s PCOX Gateway. In addition, Bridge said it has written drivers for 3Com Corp.'s 3+ and Novell, Inc.'s Netware and Netware 286 and will resell those networking systems packaged with PCS/1.

Full compatibility with Microsoft Corp.'s Windows is said to permit the PCS/1 to concurrently support asynchronous terminal-to-host and file-transfer sessions in separate windows, as well as local PC applications.

Ansa sees its future in 386

BY DOUGLAS BARNEY
CW STAFF

BELMONT, Calif. — Ansa Software reportedly plans to take advantage of the power of Intel Corp. 80386 microprocessors this year with the use of tools from Phar Lap Software, Inc. and Softguard Systems, Inc. rather than wait for OS/2, a next-generation large-memory operating system developed by IBM and Microsoft Corp. due to ship sometime next year.

Last week Ansa also announced a joint marketing agreement with 3Com Corp. aimed at strengthening Ansa's recently staked position in the local-area network (LAN) data base market. Ansa unveiled its LAN version of Paradox last month.

Data base vendors, including Fox Software, Inc. and Oracle Corp., are reportedly eager to break the 640K-byte barrier of Microsoft's MS-DOS and are willing to embrace alternatives to OS/2. Both Fox and Oracle have already announced products that will run on Intel 80386-based micros and address more than 640K bytes of random-access memory.

Although Ansa has not formally announced its product, company President Ron Posner confirmed the firm is using Phar Lap's DOS Extender and Softguard's VM/386 (recently sold to Intelligent Graphics Corp.) to develop the 386 product. With DOS Extender, so-called protected-mode, or large-memory, applications can run under the existing MS-DOS 3 family of operating systems.

While Ansa has also committed to developing a version of Paradox for OS/2, Posner argued that the firm's 386 product will be powerful enough that many users will not need to switch over to OS/2.

The Ansa and 3Com relationship reportedly involves joint marketing and a special coupon promotion that allows customers to purchase a two-user version of Paradox for $149. The two-user version will be available only through 3Com, Posner said.

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CA	Lalayette	Jul 30, Sep 24
	Los Angeles	Jul 16, Aug 13, Sep 8, Sep 30
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NC	Charlotte	Jul 22, Sep 23
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NH	Manchester	Aug 27
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NJ	Cherry Hill	Jul 30, Sep 9
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NV	Las Vegas	Jul 9, Sep 9
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	New York City	Jul 8, Jul 16, Jul 22, Jul 29, Aug 6, Aug 13
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	Rochester	Jul 30, Aug 20, Sep 22
	Syracuse	Jul 7
OH	Cincinnati	Aug 5
	Cleveland	Jul 16, Aug 13, Sep 17
	Columbus	Aug 4, Sep 30
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	Tulsa	Aug 11
OR	Portland	Jul 21
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† *Digital News*, December 1, 1986.
‡ Gartner Group currently available research.

TRBA

Fear from slow PS/2 sales called unjust

BY JAMES A. MARTIN
CW STAFF

Concern on Wall Street last week about the reportedly sluggish sales of IBM's new Personal System/2 and the effect on add-in board vendors are overblown and represent a temporary decline rather than major troubles ahead, analysts and vendors said recently.

Many technology stocks dipped for the second consecutive week, apparently because of investors' growing fears that the PS/2 is not selling well and will eventually prove to be a bust, not only for IBM, but for enhancement board vendors such as AST Research, Inc. and Quadram Corp.

But Wall Street's worries are unfounded in many respects, analysts said. With circumspect attitudes about PS/2, demand for IBM Personal Computer ATs is likely to continue to increase, meaning more opportunity for board makers to enhance the older machines.

"This is all overreaction by a nervous industry," said Jan Lewis, president of Calif.-based Palo Alto Research Group. "No one knows how successfully the PS/2 will be received. It's not a question of how successful it will be, but how soon."

AST indicated last week that its profits are currently under pressure. "We have experienced some slowness in the board-level business in the last two months," said Robert E. Maples, manager of investor relations for AST. "Large corporations and dealers are evaluating the new IBM systems and seem to be taking a longer time to make sure they want it."

AST will post increased revenue of about 20% for its fourth quarter, ending June 30, but income "will be slightly lower than the third quarter," Maples said. He declined to elaborate.

IBM's discontinuation of its original PC and some PC XT models [CW, June 8] has narrowed the add-in board market, Maples said. "About 50% of our boards are sold at the time of the machine itself, so the lack of PC and XT availability will cause some slowness as well," he added.

Intros invite downward trend

The downward sales trend is common to the introduction of a major IBM product, Maples explained. "When the PC AT was first announced, it was a year before it really started moving, and it's only now selling like it should," he said.

Quadram's sales in April — the month the PS/2 debuted — were up, but dropped in May, according to James Rush, director of product marketing. "We don't see a dramatic move in either direction," Rush said, "but sales will be a little soft until this process of evaluating the PS/2 is over."

"You can't write these companies off yet," said Phil Devin, storage industry analyst at Dataquest, Inc. in San Jose, Calif.

Cullinet loses $4.1M in quarter

BY ALAN J. RYAN
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. reported last week a $4.1 million loss for its fourth quarter and a loss of $27.6 million for the fiscal year.

For the most recent quarter, ended April 30, the company had record sales of $61.1 million, with a 13-cent-per-share loss. In the same quarter last year, the company posted $55.5 million in sales and earnings of $3.7 million, or 12 cents per share.

The quarterly results included the impact of this year's business combination with Distribution Management Systems, Inc., the company said.

Acquisition 'the right decision'

Analyst Terence Quinn of E. F. Hutton & Co. said that while revenue was up 10% for the quarter and 35% from the third quarter, "if you take out the effect of the acquisitions over the last four months, revenue was flat to modestly down from a year ago."

Cullinet's business as it existed prior to the acquisitions was down, Quinn said, noting that the only growth was in the applications area. "We think they've made the right decision in emphasizing applications, and we still have a positive outlook about Cullinet's entry into the Digital Equipment Corp. market," Quinn said.

"Fully 40% of the company's revenue for the fourth quarter was in applications," said analyst Charles E. Taylor of Prudential-Bache Securities, Inc. That figure, he said, compared with approximately 25% in applications in the like quarter of fiscal 1986. "I think the company is on the way to getting itself further out of the threat that IBM poses in the DB2 market," he added.

For the current quarter, Quinn said he expects Cullinet to report a loss in the 10- to 15-cent-per-share range. Taylor is forecasting a loss of 20 cents per share. He added that he has changed his investment recommendation on the stock to a neutral rating from the sell rating he had listed it at previously.

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All quiet in Chicago as NCC bottoms out

But new management aims to counter waning interest with renamed, revamped show next year

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — The roped-off areas told the story. The National Computer Conference (NCC), managed by the American Federation of Information Processing Societies (AFIPS) consortium of data processing and technical societies, filled just part of one floor in McCormick Place here last week — less than half the space it occupied at the same convention center just two years ago.

On with the show

• NCC product focus, rollouts, 1706 reaction and more. Pages 14 and 15.

As a result of this year's poor showing, future management of the exhibition was turned over to ISA Services, Inc., a subsidiary of the Instrument Society of America based in North Carolina's Research Triangle Park that manages the annual Instrumental Society and Automation Exhibition.

To change NCC's image, ISA has said it will rename the annual conference the National Computer Exposition (NCE) while retaining the NCC title for the technical conference that will accompany the show. The first NCE is scheduled to meet next year from May 31 to June 3 at the Los Angeles Convention Center.

ISA won out over several competitors in a last-minute search for a management firm in April. That was roughly the time when the AFIPS building in Reston, Va., was sold to raise money, NCC sources said, and after NCC management realized that projected registration for last week's show was 10,000 or less. The terms of the AFIPS building sale were not made public.

Order away

ISA's management set up an office in a corridor off the exhibit floor and said it plans to change rules that prohibit vendors from taking orders at the show. "We're making it a selling show," said Glenn Harvey, president of ISA. "There will be no restrictions on selling and on taking orders for equipment."

Show officials claimed that total registration would reach 20,000, of which 1,600 had also signed up for the technical conference, by the end of the week, but the new ISA management's estimate differed.

Philip Meade, who will be director of exhibits for next year's NCE, estimated that 12,000 to 15,000 people attended last week's show. He pointed out that of 51,000 square feet of exhibits, only 40,000 square feet was paid for.

Meade said he is aiming at reserving 90,000 square feet of exhibit space at the Los Angeles Convention Center for next year's show. By comparison, 200,000 square feet was set aside for the 1985 NCC in Chicago.

Visitors to the show were plainly shocked to see how small it had become — about the size of a Fortune 500 company's data center. "We've done the whole show in three hours," a data processing manager from Deere & Co. in Moline, Ill., said Monday. "We've been all around the floor, and we don't feel we're missing anything by going home now."

A few Deere employees returned last Tuesday for technical sessions and seminars.

Even more surprised were the dozens of international visitors, some of whom had traveled from as far away as Japan, Brazil and Turkey to see what had once been the largest computer conference in the U.S. "I didn't expect it to be that small," said Bilgehan Ozkul, managing editor of *Bilgisayar Dergisi*, a Turkish computer magazine. She was on her first trip to the U.S. "The exhibit is poor, but I am enjoying the technical conference," she said.

Ozkul also attended the IBM press conference, where she learned firsthand about the sweeping changes to the IBM product line (see story page 1).

Some attendees said they had an inkling of the show's size but continued with their travel plans. "I've been to NCC before in Las Vegas," said Ang Sen Long, director of engineering for a Unisys Corp. subsidiary in Sao Paulo, Brazil. "I knew it was going to be smaller than last time, but I happened to have a business meeting in California, and I decided to come anyway."

The theme of this year's NCC, "Discover the Power of Information," was echoed in the keynote speech by Robert W. Galvin, chairman of Motorola, Inc. in Schaumberg, Ill. Galvin urged an audience of 500 last Monday to develop their information systems technology so the U.S. can continue its dominance of the world economy.

> "WE'VE DONE the whole show in three hours . . . and we don't feel we're missing anything by going home now."
>
> DP MANAGER
> DEERE & CO.

"The state of a nation's information systems will determine its ability to dominate the world's prime service businesses," said Galvin, who relinquished his title as chief executive officer of Motorola last year. Japan, he suggested, is developing an edge in service-related information technology.

Excellence in information systems management was the theme of another event, the presentation of the third annual Excellence in Technology Award, which is jointly sponsored by the Gartner Group, Inc. and *Business Week* magazine.

The award was given to William O. Bailey, vice-chairman of Aetna Life & Casualty Co. Bailey was credited with developing the concept of serving Aetna's field offices with minicomputer-based systems.

In accepting the award via satellite from Zurich, Bailey acknowledged the role that informations systems had played in making Aetna a financial success, with $110 billion in assets and $16 billion in claims payments a year. "We rely on these systems to provide timely input in our decision-making process," Bailey said.

Peripherals fill larger product vacuum at NCC

BY JAMES CONNOLLY
CW STAFF

CHICAGO — With key mainframe, minicomputer, personal computer and software companies staying home, the new-product focus shifted to peripherals vendors at the National Computer Conference held here last week.

Product introductions included enhancements to mainframe-class laser printers, a thumbprint-reading security device and personal computer-oriented storage devices.

Xerox Corp. enhanced two of its laser printers. The company introduced a third-party adapter that ties its 24-page/min 3700 laser printer to IBM mainframes via channel attachments.

The printer, previously attached to hosts by local-area network connections, reportedly can emulate an IBM 3211 line printer through use of the KMW Systems Corp.-supplied adapter, which costs $5,400.

Xerox also announced personality cartridges that allow its 4045 Laser CP printer to emulate the Hewlett-Packard Co. Laserjet and Epson America, Inc. FX-80 and 100. The cartridges also produce vector-graphics output from host computers or PCs. The HP and Epson cartridge and Xgraph vector-graphics cartridge cost $250 each.

Data/Ware Development, Inc. introduced an IBM-compatible mainframe optical-storage transport, the DW3400. The system uses removable 12-in. nonerasable optical-disk cartridges to store up to 1G byte of data on each of two sides. The system was designed to emulate standard IBM magnetic tape units. It reportedly supports up to four optical disk drives and stores up to 27 cartridges in the DW34800-D configuration, which costs $60,295. It is also available in two jukebox configurations with support for up to 95 cartridges. Base prices for those configurations range from $157,940 to $187,145.

Thumbscan, Inc., an Oakbrook Terrace, Ill.-based company, claimed to be the first vendor to offer a fingerprint-reader security device that is tied directly to a computer system. Company President Peter Dignan differentiated the Thumbscan system from other fingerprint-reading products by noting that earlier devices have been aimed at limiting physical access to equipment rather than preventing unauthorized users from logging on to or booting up systems.

About the size of a microcomputer modem, the Thumbscan device is said to use biometric technology and to tie into templates on various mainframe and minicomputer security packages via coaxial cable to prevent unauthorized users from logging on. For microcomputers, Thumbscan attaches via an RS-232 port and can prevent a user from booting the system. The security device costs $550. Mainframe templates cost $9,500, and minicomputer templates cost $5,500.

Thumbscan also announced its acquisition of Gordian Systems, Inc., a Palo Alto, Calif.-based maker of hand-held user-authentication systems.

In a flurry of announcements aimed at OEM-volume customers, Fujitsu America, Inc. unveiled products including IBM 3480-type cartridge tape drive. The company emphasized that the M2463A tape unit and M1013A controller are not intended as 3480 replacements but were designed to be compatible with the Federal Information Processing Standard 60 interface for data interchangeability with IBM. Available now, the M2463A costs $43,000, and the M1013A costs $65,000.

Fujitsu also introduced the 10M byte/sec. M1060 disk controller, which was designed to be compatible with the Intelligent Peripheral Interface-3 standard. The superminicomputer-oriented controller provides a master-slave architecture in which the host and peripherals communicate over a common, device-independent bus via high-level command packets. It costs $6,000.

Aimed at high-end PC markets

Fujitsu targeted the high-end portable and personal computer markets with two 3½-in. Winchester disk drives. The company said the M222XDR series of drives, which have formatted capacities of 58M and 76M bytes, are compatible with the ST506 standard and feature 35-msec positioning. The drives should be available in production quantities during the fourth quarter for prices starting at $645.

Fujitsu also announced two half-height 5¼-in. Winchester drives with 25-msec positioning for personal computers. The 86M-byte M2243T costs $1,000, and the 129M-byte M2243R costs $1,150.

In addition, Fujitsu added two 24-wire dot matrix printers and an image scanner for large documents to its line. The company displayed its Focus 9600 private branch exchange, which is a digital, nonblocking switch designed for use in an integrated systems digital network.

Modular Power Corp. introduced an uninterruptible power supply (UPS) made up of a series of 9- by 9- by 6-in. modules, with each module providing up to 12 kVA of power. The Upstar UPS reportedly provides up to 360 kVA in a single unit and has a base price of $30,200.

Networking debuts share NCC limelight

BY MITCH BETTS
CW STAFF

CHICAGO — Though overshadowed by IBM's product announcements, several vendors chose to unveil local-area network (LAN) and network management products at the National Computer Conference held here last week.

Nestar Systems, Inc. introduced its Planstar LAN for Ungermann-Bass, Inc.'s Arcnet and IBM Token-Ring configurations. The file server, designed for small to mid-size network users, is Nestar's first low-end LAN, officials said.

Nestar said Planstar Model 1 is priced at $6,700 and provides an 80M-byte disk drive with a 60M-byte streaming-tape backup drive. Planstar Model 2 carries a price tag of $9,600 and provides a 150M-byte disk drive and a 150M-byte tape drive.

Nestar, a Mountain View, Calif.-based subsidiary of DSC Communications Corp., also introduced the following products at NCC:

- The Planstar CCITT X.25 Gateway System, which is said to allow 32 LAN workstations concurrent access to public data networks and is priced around $5,000.
- The Intelligent Network Interface Card, said to allow simultaneous operation of a personal computer and Token-Ring networking by way of its coprocessor design. It is priced at less than $300.
- An asynchronous communications server for managing up to 16 modems that is priced at $5,995.

Another DSC subsidiary, Granger Associates, Inc. in Santa Clara, Calif., introduced an enhanced version of its CP2000 intelligent T1 multiplexer, priced in the $10,000 to $40,000 range.

Granger executives said the multiplexer is a fully network-compatible and customer-programmable gateway, capable of handling 20 T1 lines per node.

GTE Spacenet Corp. in McLean, Va., a subsidiary of Stamford, Conn.-based GTE Corp., introduced a Unix-based network management system that it said will be bundled with its Skystar satellite data services at no extra charge.

Ray Marks, vice-president of marketing at GTE Spacenet, said satellite-based networks allow users to reconfigure their networks throughout the day without interrupting service.

"A bank, for example, must be able to rapidly change its data communications environment at the close of the normal business day from interactive, 'bursty' traffic to a batch mode, which is essentially a point-to-point configuration," he explained.

GTE Spacenet also announced a satellite-based 56K bit/sec. point-to-point data circuit designed to compete with land lines. The offering is priced at $1,700 per month, including the very small-aperture terminal at each site.

In addition, Northern Telecom, Inc., based in Nashville, introduced enhancements to its Meridian Lanstar PC product. The enhancements redefine the local-area network as a standalone product to be implemented by MIS managers [CW, June 15].

Meridian Lanstar PC is now offered as a discrete LAN — unattached to a private branch exchange — that serves from 32 to 1,344 PCs connected by standard telephone wiring. The product costs $750 to $900 per node.

DP consultants blast IRS tax ruling

Prepare to wage uphill battle for Section 1706 repeal

BY MITCH BETTS
CW STAFF

CHICAGO — Independent computer professionals last week blasted the Internal Revenue Service's May 21 attempt to clarify their employment tax status under Section 1706 of the Tax Reform Act of 1986.

"This ruling makes things even worse," said Sheldon Goldberg, president of the Chicago chapter of the Independent Computer Consultants Association (ICCA).

The ICCA and several other groups opposed to Section 1706 spoke out at a press conference held during the 1987 National Computer Conference here last week.

Section 1706 requires any independent data processing professional placed in a job by a broker to be considered an employee of the broker for tax purposes if the broker has significant control over his work.

Common laws to clarify

On May 21, the IRS issued a revenue ruling that uses 20 common-law tests and three sample cases to help determine whether a professional should be classified as an employee of the broker or as an independent contractor.

The ICCA and its allies argued that, instead of clarifying the issue, the IRS ruling "has only added to the chaos in our industry already caused by the Jan. 1 effective date of Section 1706."

Critics said that the IRS ruling fails to cover the most typical broker-consultant business practices and applies common-law rules that are biased against contractors.

"At least half of them [the common-law rules] are ridiculous," said Tom Golway, president of the Technical Consultants National Association.

"The IRS has woefully failed to understand our industry," added Tim Waterloo, president of the Midwest chapter of the National Association of Computer Consultant Brokers.

Waterloo said the use of common-law tests "is a move backward instead of a move forward."

In 1978, Congress decided that common law was inappropriate for high-tech professionals and granted a safe-harbor exemption, but Section 1706 of the 1986 tax law removed that safe harbor, Waterloo observed.

Critics said the inadequacy of the IRS ruling makes it more necessary than ever to seek legislative repeal of Section 1706, but they acknowledged that they will be fighting an uphill battle.

Opponents of Section 1706 said their best hope is to attach repeal language to a major budget bill or the technical corrections bill for the 1986 tax law.

However, key members of Congress reportedly are opposed to making substantive changes in the 1986 law out of fear that even one change could open the floodgates to special-interest amendments and could upset the delicate compromises that led to the enactment of the tax reform law.

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California may stiffen computer crime penalties

BY JEFFRY BEELER
CW STAFF

SACRAMENTO, Calif. — A proposed law that would greatly broaden this state's authority to prosecute computer crimes faces an impending legislative test that will likely determine whether the bill is ultimately enacted or killed.

On June 29, Senate Bill 255 (SB 255) is scheduled to be heard before members of the California Assembly's Public Safety Committee.

How the legislation fares during the hearing will prove "critical" to its eventual fate, according to Dave Estrada, legislative analyst for the Countywide Criminal Justice Coordination Committee in Los Angeles.

"If it survives the June 29 hearing, SB 255 will probably move unhindered through the rest of the legislative process" and be signed into law, according to Charles Fennessey, consultant to the author of the bill, State Sen. Ed Davis.

But if the reception in the Public Safety Committee is negative, "the whole effort could die there," Fennessey said.

The upcoming hearing will mark the second time this year that proponents have submitted the bill to the Public Safety Committee.

After sailing through the California Senate without incident, SB 255 encountered its first major legislative impasse during its initial hearing before the Public Safety Committee, which criticized the bill and sent it back to be reworked.

In particular, committee members found fault with the legislation's proposed penalties, which they described as overly harsh, according to Estrada.

Under SB 225, the severity of punishment for an unauthorized systems access would depend not on the dollar value of stolen computer time but on the expense of assessing or repairing damage to the user's property.

Felonious act

If the bill passes, a systems break-in that, for any reason, costs a victim more than $5,000 could leave the perpetrator, at the prosecution's discretion, liable to a felony, Fennessey said.

Probably the most important feature of the bill is a provision that would, in effect, eliminate proof of malicious intent as a requirement for convicting defendants of computer crime.

Under the suggested legislation, accused wrongdoers could be found guilty of systems tampering regardless of whether they were aware that their illicit activity might prove destructive, Fennessey said.

Even if an electronic security breach left a system entirely unscathed, the perpetrator could still be held legally responsible for the cost to the victim of having to verify its data and software integrity, he added.

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EDITORIAL

Show must go on

We decided to poll MIS professionals at the National Computer Conference in Chicago last week to find out what they want to see in future conferences and trade shows. The problem was, we couldn't find many people to poll.

We looked on the exhibit floor, but all we saw were people wearing the blue badges of the press attendees and the red badges of the exhibitors.

We looked in McCormick Place's eatery, but for the most part, we found foreign attendees who were really unhappy about having traveled so far for the show and didn't feel much like talking.

We looked in the show organizer's office but were confronted by a young man who thrust into our hands a leaflet announcing that NCC was coming under new management. "It's about time, don't you think?" he said very cynically.

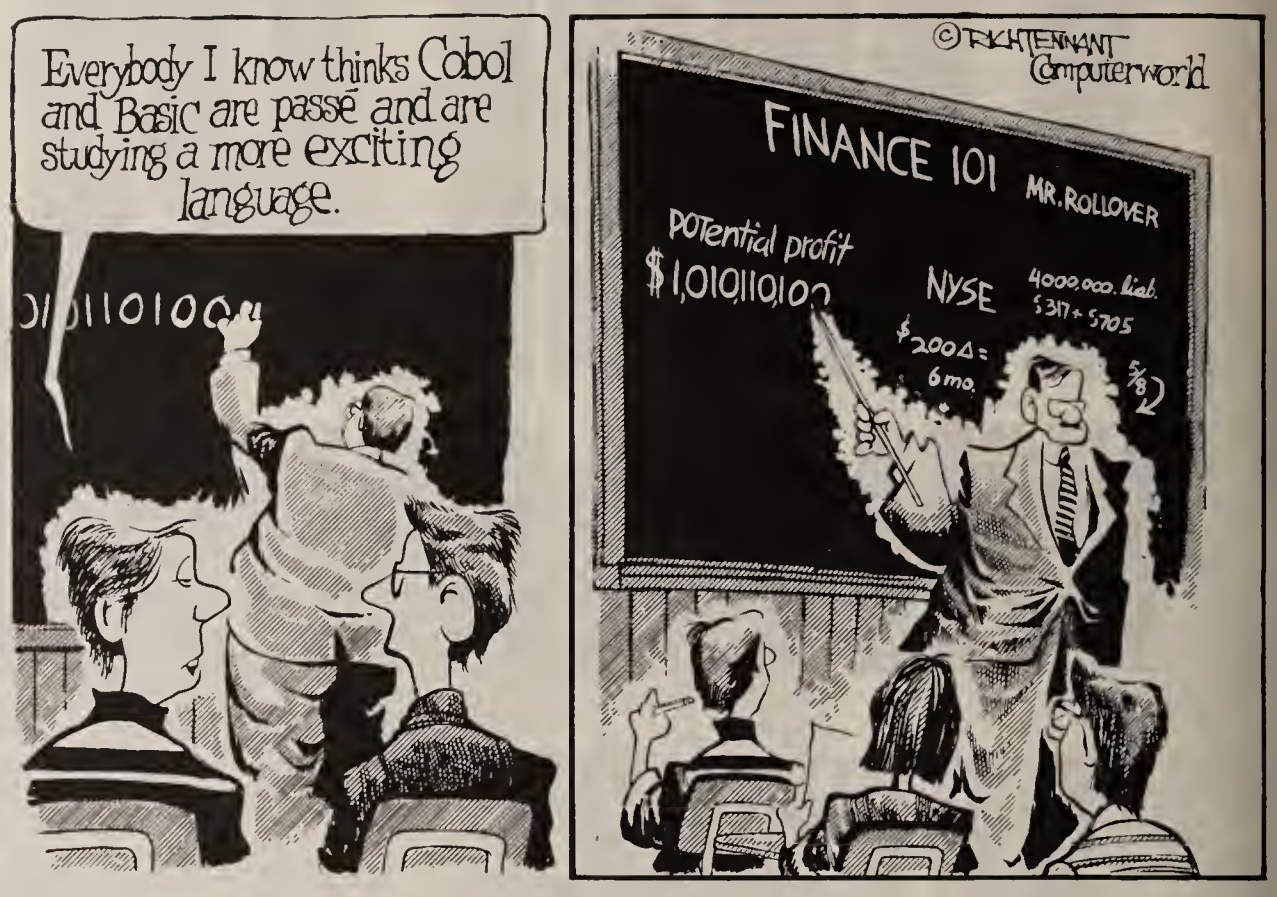
Okay. NCC has finally fallen all the way on its sword, and that's no surprise. The question now is the same one we sought at the show. What lies ahead for MIS in trade shows and conferences?

Several show organizers are moving to fill what is an obvious gap in serving MIS with a general-purpose conference. The Interface Group, Inc. will host the World Computer Conference in March 1988 in conjunction with its Interface communications show. NCC will become the National Computer Exposition under new management. Others, too, are testing the MIS conference waters.

They all believe that MIS needs a closely targeted show that, perhaps more than all else, gets back to some basics for MIS. We endorse these efforts and hope that show organizers will look closely at the mistakes made with NCC but also take the time to fully understand the dynamics of the MIS environment, an environment that is rapidly evolving.

With this in mind, any conference agenda should include healthy doses of the following items:

- **Systems integration.** This is *the* buzzword for MIS for the next five years or so, as shops large and small struggle to tie disparate systems together in a seamless, cohesive networked system.
- **Strong focus on high-end systems.** Recent moves by IBM, Digital Equipment Corp. and others will restoke large-systems sales, although the nature of large systems is changing from being the hub to being a sort of large-scale file server for the growing legions of desktop workstations.
- **Personal computer workstations but in the context of larger systems.** The day of the stand-alone PC in medium and large organizations is ending, and MIS is being thrust into the predominant role of integrating PC workstations into the networked system.
- **Back to basics.** Let's see more on programmer productivity, finding and keeping good staff and emphasizing the role of MIS as implementor.



LETTERS TO THE EDITOR

Not complete story

I waited with great anticipation for the feature story on the National Computer Conference (NCC) [CW, May 18]. I was aware of plans to publish this story since I was contacted by *Computerworld* and asked to give my thoughts on the future of NCC.

I believe that, as an ex-staff member of the American Federation of Information Processing Societies (AFIPS), it was thought that I would feel free to provide some interesting "dirt." As a matter of fact, I did feel free to comment and did so. Needless to say, I was surprised when I received the issue only to find that none of my comments were included.

While the article, "It's the worst of times for NCC," was fairly factual — the figures on numbers of exhibitors, attendance and the net square feet is widely known — it was by no means complete. Over the years, the myriad of computer publications have gone out of their way to point out all that was or is wrong with NCC, while, at the same time, reaping profits from NCC exhibitors in the form of advertisements.

The point I'm trying to make is that NCC has been quite good to you over the years. How about sharing with your readers the tremendous contributions that AFIPS and NCC have made to the computer industry? Who started computer conferencing in the U.S., anyway? It certainly was not the trade press. What forum has consistently provided the industry with the most comprehensive technical programs?

CW is quick to make comparisons between Comdex shows and NCC. Does it come as a surprise that a for-profit company can out-market a not-for-profit, educational association? Is it not true that a for-profit company, by its very nature, is capable of responding more quickly to a changing marketplace than one run by a committee? Don't get me wrong; Comdex is an excellent show and The Interface Group, Inc. deserves our applause for its success. But remember, it is NCC that is run by the profession for the profession.

It is not my place or my desire to speculate on the future of AFIPS or NCC. But I do realize that such an exercise on your part makes good copy. By all means, continue to report the news; that is what you are supposed to do. Just keep in mind the contributions that AFIPS has made and continues to make to the computer industry.

Richard L. Dobson Jr.
Director of Exhibits
National Association of Broadcasters
Washington, D.C.

This week in history

June 20, 1977
The current "aspiration explosion" for the concept of distributed data processing is "far beyond what can be achieved," Amdhal Corp. chairman Gene Amdahl says at the National Computer Conference in Dallas. Distributed DP will come, but it will be in a far different and more limited form than presently envisioned by the concept's proponents, he adds.

June 21, 1982
The National Computer Conference wraps up the largest exhibit in the show's 31-year history when the last of its 93,000 attendees walk out of the Houston Astroarena and head home. Nearly 700 vendors used more than 320,000 square feet of display area as the NCC shifted its focus from mainframes to microcomputers.

Atypical ruling

I was appalled when I read the "This week in history" column [CW, May 4]. The column cited a May 3, 1982 case in which the accused was using his employer's computer to store horse-breeding information.

The judge dismissed the charges because the accused had legal access to his employer's computer, and, hence, theft of services had not occurred.

You were remiss in not mentioning that this type of ruling is not made by more enlightened judges.

I am sure most of the data processing community would agree that this activity is unethical at the very least. I know of companies that would discipline an employee for such activity.

Your publication is widely read and is used as an authority by many in the profession. Therefore, you have a responsibility to not only report the news but also portray it in a professional manner.

The item you published certainly did not accomplish that goal. An informative comment would have substantially increased the value of the column.

Ralph E. Brandt
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Cracking China, the untapped market

FREDERIC WITHINGTON

Without much fanfare, the ease of use and price of the personal computer have been married with the transaction processing software of the mainframe. The result is the first generation of business computers that can be really useful to the small business (fewer than 100 employees). A hundred million or more of these machines are likely to be sold worldwide during the next decade — a huge market and also, we may hope, a significant factor in improving world living standards.

Business machines have been available to small organizations for years. Probably the most successful has been the ledger-card accounting machine, which is good for keeping individual account records and satisfactory for developing accounting totals. Its paper files are clumsy, though, and it is impractical to develop management information (for example, a sales history by product and customer type) with an accounting machine.

Punched card and magnetic tape computers, with their formal procedures and unavailable files, never appealed to small business. The disk-based minicomputer systems of the 1970s came closer but still didn't make it. Their software required the user to have some technical knowledge, their functions were limited, and their $20,000 price tags were too high for a very small business.

Parts of the answer came from different directions. Larger systems like IBM's System/38 appeared with automatic terminal and data base management. Tandem Computers, Inc. and others developed automatic transaction managers. Value-added resellers and business computer stores developed application packages for many enterprises, not only businesses, but town governments, schools, churches and so on.

Then the PC industry provided three key parts: interfaces for untrained users, ancillary functions of word processing and communications and, not least,

Continued on page 22

A 30-year veteran of the computer industry, Withington was a vice-president of Arthur D. Little, Inc. and is now an independent consultant. He has written four books and more than 60 articles and papers.

The commercial value of a hint and a wink

STANLEY GIBSON

The venture capitalist had seen it all before. Now he was mad at himself. At the last board meeting, he thought he had made the seriousness of the situation clear to the entrepreneurs now before him. Apparently, he had not.

Across the table, the product manager of the fledgling company was nervously shuffling papers and saying that, on the bright side, the new microcomputers did have a delivery date. And a large and expensive ad campaign had been launched, complete with well-known TV characters.

Well, no, the hardware itself offered few advantages over other products on the market, he admitted. The real gains would come from the operating system.

The product manager began to fidget as he explained how the operating system was not ready yet; but it would be, that much was *certain*. He just didn't feel comfortable giving a specific date. But an operating system "tool kit" could be shipped to developers shortly, even though it wasn't bug-free.

The venture capitalist shifted his weight, stifling a groan.

And, oh yes, existing software programs would have to be converted to a new disk drive size. Sure, customers would go along with that. No problem.

The venture capitalist found the situation intolerable — a potentially difficult conversion process glossed over and the software behind schedule as usual. But this time, it was a year behind.

The product manager knew, deep down, what was coming.

"That's it!" the venture capitalist exclaimed. "I'm pulling the plug. Starting Monday, my recovery team will be in to take over."

But we all know, in the case of a recently announced personal

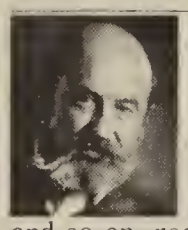
Continued on page 22

Gibson is a *Computerworld* senior writer.

Toward voice-input orientation

Why the voice-to-printer technologies will rise in the East

CHARLES P. LECHT



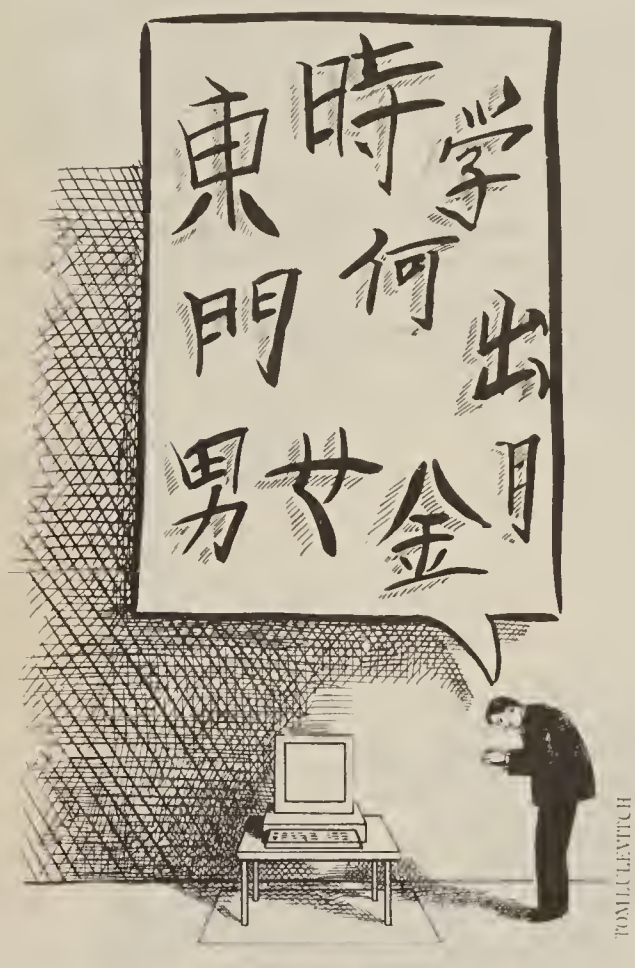
Creating the kind of printing we're accustomed to receiving from a typewriter, such as letters, reports and so on, requires typing, and there are still a lot of people who don't like to do it.

Word processors certainly make typing easier, but they still aren't user friendly enough for executive use. Let's face it, most executives never wanted to type and never will. I suspect that if today's word processors could accept voice input along with keyboard input, their sales to and usage by executives at all levels would soar.

I forecast that such systems are just beyond the horizon, and they will be created first in Japan.

The percentage of executives who can and wish to type doubtless hasn't changed much from the good old days of typewriters. Executives dictated their typing to a secretary who translated the dictation into imprinted characters on a page. The translation process usually involved an encoding of the executive's words into shorthand while these were placed into a buffer — the shorthand pad. Later, the secretary decoded the symbols and caused their imprint on paper through typing.

Word processors haven't changed this often-troublesome process. As I see it, we are on the brink of eliminating the need to employ a secretary as a dictating machine, to everyone's benefit.



TOM LEVITCH

No dumb gadgets

To do so, we must augment our current word processor technologies with voice capturing systems. Not one of the dumb gadgets I've seen at trade shows with the working vocabulary of a nincompoop, but one that incorporates the intelligence to faithfully reproduce dictation on paper and even correct the usual mistakes.

Many have been working at making such a machine with little success. But I am a believer. Anyone who has noticed that a few million instructions per second have been moved onto his desk with enough fast memory to contain his writing during his useful work life would quickly become a believer, too. With this feat, the main impediment to creating a useful voice processor is fading as quickly as our capability to do voice-pattern recognition is emerging.

Because of the keyboarding problem in the Orient, the first such usable systems will emerge there. There the largest payoff for such systems is guaranteed. Without voice input, there is a need to key some 50 *katakana* characters (Japan's alphabet for words of foreign, except Chinese, origin), some 50 *hiragana* characters (the alphabet for words of Japanese origin), a minimum of some 2,000 *Kanji* characters (for words of Chinese origin) plus the 26-letter English alphabet. (After incorporating several thousand Chinese and Japanese characters into their alphabet, what's 26 more?)

Living in Tokyo, you see a blizzard of signs that contain words that offer a mixture of all four alphabets. Any disbelief about the need to process the alphabets quickly disappears during one walk around Tokyo's Ginza district. Making a keyboard to handle *hiragana, katakana* and English is a routine task these days in Japan, but doing so for *Kanji* is another thing.

Keyboarding *Kanji* is a really troublesome process. Some 2,000 characters are minimally required for daily reading and writing in Japan, but the actual number in use by scholars is unknown. Some estimate it to exceed 8,000. There is no practical keyboard that can handle even the minimal set, although many have been attempted. If the image of a gigantic keyboard is present in your mind, you're not far off base.

Clever methods

When computer systems became fast enough and memories large enough, many clever methods of creating *Kanji* evolved. One of the most ingenious involved mapping *hiragana* and *katakana* into *Kanji* through phonetics.

First, the typist created a phonetic *hiragana/katakana* version of the word or character to be expressed in *Kanji*. He then entered the phonetics as input to a *Kanji* software program and — voila! — a short list of *Kanji* characters appeared on the screen ordered by the highest to lowest probability of the *Kanji* he likely wanted. The typist then scrolled through these characters to find the one most suitable and stroked a key to capture it in his file. Later systems incorporated context considerations, and recent systems employ artificial intelligence to produce the *Kanji* candidates.

At best, the process is cumbersome and involves trial-and-error. Is there any doubt that the Japanese have an intense interest in voice input? A slew of Japanese software houses have been working on improving the *Kanji* input problem. All the major Japanese manufacturers long ago undertook the translation of keyboard-entered *Romanji* (Japanese using English character-set phonetics) to *Kanji*, *hiragana* and *katakana*, but a few of the more progressive manufacturers are hell-bent to relegate it to voice. Among the most successful appear to be Fujitsu Ltd. and NEC Corp.

Voice-to-printer technologies have been worked on for a long time in the U.S. and in Japan; AT&T Bell Laboratories, where research originated in an attempt to help the deaf and hearing-impaired use telephones, may be the leader in the former. It should be interesting to see which country produces the first really useful word processor with satisfactory voice-input facilities.

If the problem of capturing Japanese with its thousands of characters is close to a solution, can English with its 26 characters be far behind?

Lecht is chairman of Lecht Sciences, Inc./Japan, a Tokyo-based software think tank specializing in graphics. He is also an elected public member of the Hudson Institute and a free-lance writer on science topics.

Cracking China

CONTINUED FROM PAGE 21

prices of $5,000 or less for a complete system. Saturation of the initial PC market provided a backhanded impetus, too — a lot of clever people started to search desperately for new PC markets.

They found them. A survey by CAP International, Inc. in Marshfield, Mass., indicates that U.S. small businesses spent $13.1 billion for computers and office automation in 1986, and that the steadily increasing U.S. market will total $80 billion during the next five years.

PC-based systems will increasingly dominate as they replace copiers and typewriters, as well as older business machines. This market size is equivalent to the PC market in its heyday and doesn't appear to be saddled with the same downside potential.

Successive generations of small business computers can be expected to incorporate telephone control (eliminating the keyset), image processing (eliminating the copier) and degrees of voice processing and artificial intelligence (eliminating the receptionist). These features can be expected to keep the market growing, if only because of replacement and increased usage. The CAP International survey bears this out; although more than half the small businesses in the U.S. already own a computer, almost a quarter are going to buy one in the next year.

At the opposite extreme is China. A billion people live there (officially expected to top out at 1.5 billion) but few large, state-run enterprises exist. Small business is everything — food and clothing stores, bicycle repair shops and agricultural collectives. Each has a formally designated clerk in a little office who handles all the money and papers and prepares everything in duplicate on flimsy forms. These professionals might be receptive to new methods that save time and conserve precious resources of money and material, especially if encouraged by the government.

No one knows how many small businesses there are in China, but if the number is 100 million and each one spent $5,000 for a computer, the total market would be $500 billion! There is no technical reason why this projection could not become reality. The Chinese language problem is completely solved. Most of the small businesses could probably cost-justify a machine during a period of time. (Remember that it will communicate, automatically schedule and reorder and provide all office automation functions).

Funding could be provided by revolving credit from the government or offshore suppliers eager to build export markets. Japanese suppliers will be vitally interested, awash in strong yen and fresh from saturating their own market with Chinese-language systems, but the Americans are not out of it yet.

IBM, Unisys Corp. and NCR Corp. offer small business systems in Japan, and Wang Laboratories, Inc. has a strong relationship with Taiwan that may be useful. The Chinese government will, of course, control its market and not let imports dominate it, but surely there would be some rewards for foreign partners.

The Indian market is the next largest and perhaps more easily reached because of the high level of literacy in India. The Japanese already operate there, but some U.S. firms (notably Unisys) have also been active in India, and at the local level.

Many other countries could also support a proliferation of small business computers: all of the European nations, including the Communist bloc; Brazil and most of South America; Indonesia and most of Southeast Asia. Some African countries are ready, too, but not the poorest. Perhaps icon-oriented interfaces can be used by people lacking conventional literacy, and the obvious economic benefit of the machines will lead to ways to pay for them.

"Revolutionary" is probably the right word. The cumulative market for these new small business machines may eventually reach $1 trillion, revolutionizing the computer industry. And maybe their contribution to the better use of world resources to support an ever-increasing population will also deserve the term.

Hint and wink

CONTINUED FROM PAGE 21

computing system much like the one described above, this is not what happened. It did not happen because the company introducing the new system, IBM, has a revenue of $50 billion and makes a hefty profit. However, it is certain that start-up companies have been shut off by their venture capitalists for much less than what IBM did when, in an act of "industry leadership," it announced its Personal System/2.

It may be that a hint and a wink from IBM are worth more than written guarantees from a company that could be out of business in six months. IBM, however, should not get carried away.

Despite the fact that early announcements once got it into trouble, IBM reportedly told the consultant community it would continue to announce products earlier than in the past, apparently feeling frisky again, five years after its U.S. government antitrust suit was dropped.

Announcing products well before they are ready is not good, and when IBM does it, as in the case of the 9370 and the PS/2, the company should be taken to task. IBM should not go back to the days of the 360, which it effectively preannounced and, as a result, froze the market.

SOFT TALK

Steven Pfrenzinger

Revolution ahead for DP

Substantial changes in the way production software is designed, developed and maintained in the future will affect the careers of most DP professionals.

These transitions are occurring in life-cycle methodologies and their related tools and are changes that many DP professionals are either unaware of or unwilling to accept. Your career can benefit from these changes with some careful planning designed to take advantage of opportunities that will inevitably arise.

You have probably heard the word "revolution" used many times to describe what is happening in the world of software development. Well, if revolution means radical change, then this *is* a revolution. Whether you believe it or not probably has a lot to do with your willingness to accept change and whether you have kept current with new technologies.

Before we discuss the opportunities, a review of current events is appropriate. Those events include the following:

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DEC supports Unix V for AT&T

Move contradicts firm's stated desire to handle only own VMS, Ultrix

BY NINAMARY BUBA MAGINNIS
CW STAFF

OMAHA — Digital Equipment Corp. is offering to AT&T and regional Bell holding companies Unix System V support on DEC equipment, although DEC President Ken Olsen claimed the firm will only support its VMS operating system and Ultrix, its proprietary version of Unix that is based on the University of California at Berkeley's Unix 4.2.

DEC refused to comment on its apparent willingness to satisfy the telecommunications companies' request for AT&T's Unix System V. DEC spokesmen would not say whether Unix System V support would be offered to other DEC customers.

Omaha-based Northwestern Bell has used a DEC VAX 8600 and Unix System V since last summer and will expand its VAX Unix System V installation this year, according to George Green, a manager for user support at Northwestern Bell.

The VAX 8600 replaced an AT&T 3B20 computer, Green said, explaining that Northwestern Bell runs six Unix System V-based machines: a VAX-11/750, the 8600 and four 3B20s. The systems run Automated Information Manager (AIM), an older AT&T office automation software package.

Northwestern Bell adheres to a Unix platform for historical reasons, Green noted. "We were starting to grow on Unix before it got popular," he observed.

The 8600, which services 60 concurrent users out of a possible 800, operates AIM's electronic mail software and is part of an interstate network connecting Nebraska, Iowa, Minnesota, North Dakota and South Dakota, Green said.

The system serves nontechnical users, mostly managers in the five-state area who need to

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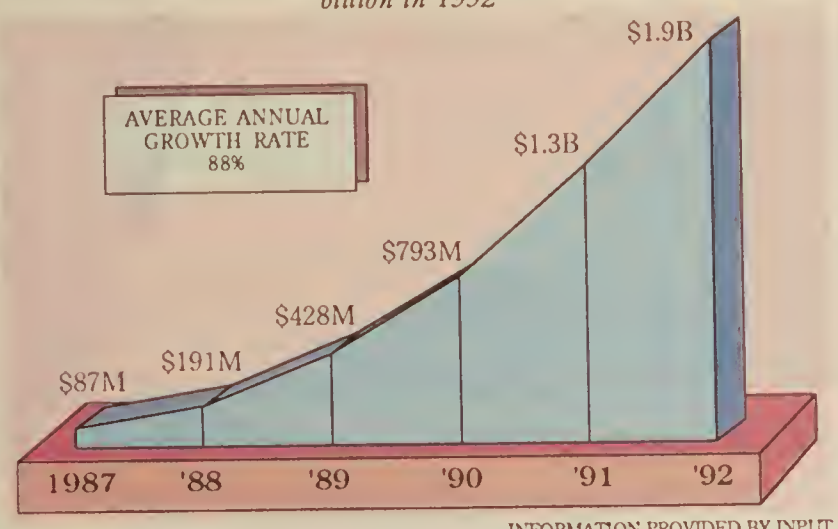
Data View

EDI market pushes toward $2 billion

The market for Electronic Data Interchange - the electronic transfer of business information between organizations, overcoming differences in processors, protocols and formats - reached $46 million in 1986 and is projected to grow to $1.9 billion in 1992



INFORMATION PROVIDED BY INPUT
CW CHART

IBM updates RACF system

BY ROSEMARY HAMILTON
CW STAFF

RYE BROOK, N.Y. — IBM has announced plans to ship a new release of its mainframe system security software that it said will support its new high-end VM operating system, VM/XA SP.

The Resource Access Control Facility (RACF) Version 1.8 was rolled out with the new VM/XA earlier this month along with other VM software enhancements.

RACF, dubbed by the vendor as its "strategic security product," has garnered a 30% share

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Tool uses two design methods

BY CHARLES BABCOCK
CW STAFF

SANTA CLARA, Calif. — A software design tool that permits the use of either Yourdon or Warnier-Orr design methodologies on an IBM Personal System/2 has been introduced by Visual Software, Inc.

VSdesigner takes advantage of the advanced graphics available on the PS/2 and is able to transfer the results to a mainframe for further development work, said David G. West, president of the firm.

"Visual Software's effort is to merge different methodologies in one product," noted Edward W. Acly, program manager for software technology at International Data Corp.

He said the tool is compatible with Video Graphics Array and offers an object-oriented data base management system, a relational system said to be capable of managing objects or modules of code with their historical information. VSdesigner is priced at $7,500 and is available now.

Inside

Vendor confusion marks Usenix

BY ELISABETH HORWITT
CW STAFF

PHOENIX — The recent Usenix conference, like Uniforum 1987, The International Conference of Unix Users held earlier this year in Washington, D.C., saw a great deal of discussion — and confusion — about how soon Unix standards will provide application portability among different vendors' implementations.

In his keynote address, Next, Inc. President Steven Jobs stated that there must be one standard version of Unix if it is to survive past 1990. Jobs said that Unix standardization must go beyond the Unix kernel — which is the focus of the current Posix standardization effort — up to the application-toolbox level.

During an informal luncheon panel hosted by Usenix, an international professional organization devoted to Unix, panel members could not come to a consensus about what elements of Unix should be standardized.

At odds with Unix vendors

Usenix Treasurer Stephen Johnson, who is vice-president of Dana Computer, Inc. in Sunnyvale, Calif., said the attempt to set standards appeared to be at odds with vendors of Unix versions. "All manufacturers would have you believe that their versions of Unix are better and different," he said.

A press representative asked the panelists when Unix would "have the binary compatibility you have with [Microsoft Corp.'s] MS-DOS."

Usenix director John Quarterman, who is a partner at Texas Internet Consulting, pointed out that Posix, the Unix standard still under development by the IEEE, currently "does not include binary object file specifications." Users currently can port applications between the University of California at Berkeley's Unix 4.2 and AT&T's Unix System V, Release 3, but minor code changes are necessary, he said.

Usenix President Alan Nemeth, a Prime Computer, Inc. consultant, claimed that application portability for Unix systems is far easier than it is between, for example, a Digital Equipment Corp. VAX VMS computer and an MS-DOS workstation.

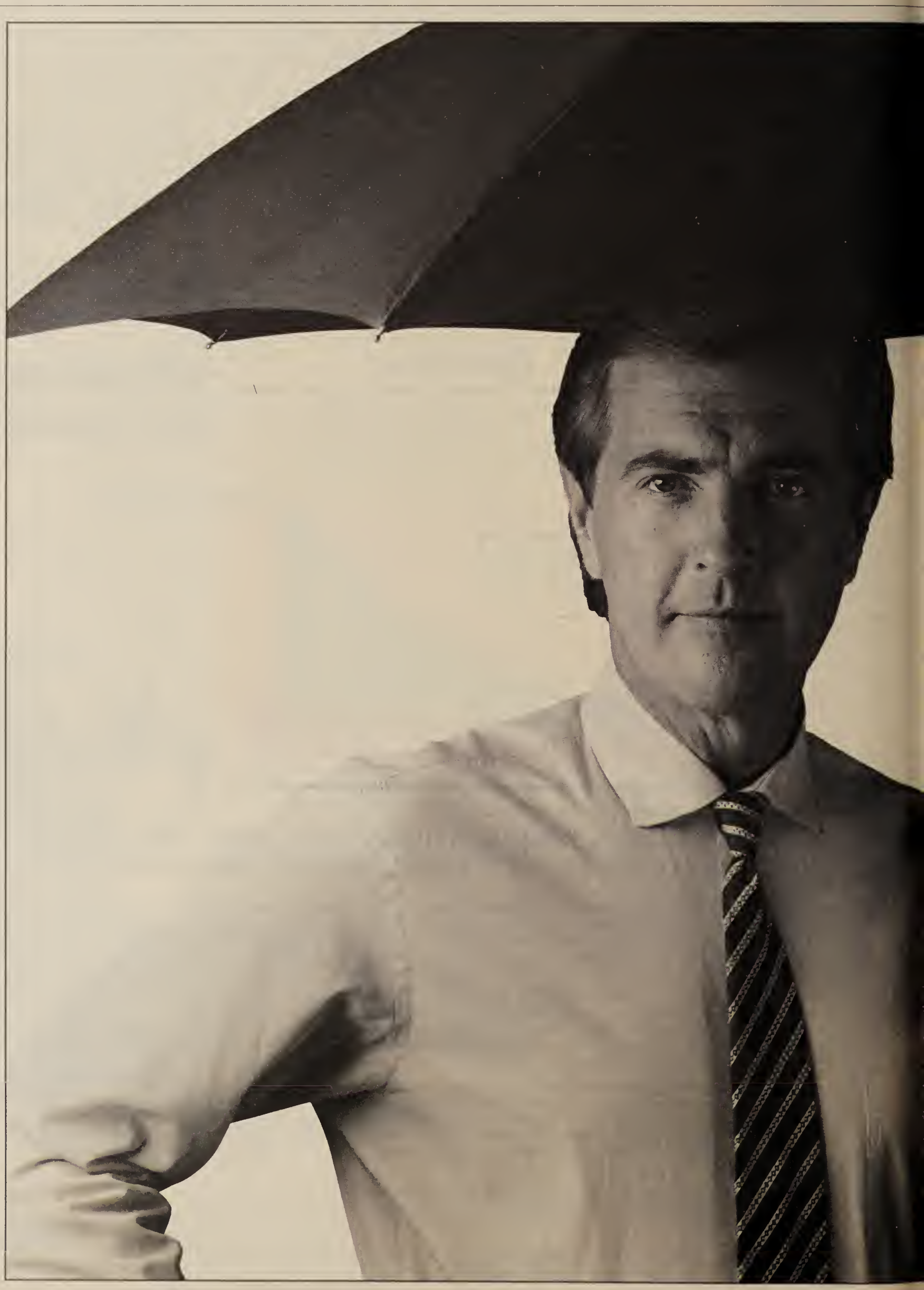
Usenix director Rob Kolstad, who works for Convex Computer Corp., emphasized that "application portability is not a binary — that is, a yes-no — issue," suggesting that what Unix really provides is "programmer portability" — the ability to move a program from one Unix implementation to another without the need for retraining.

"Graphics and networking issues have yet to be resolved" in a Unix standard, said Deborah Scherrer, Usenix vice-president and a computer scientist for software developer Mt. Xinu in Berkeley.

Kolstad claimed that the wide variety of Unix shells is "not a major problem for application portability, since many applications can make a call to a shell — although this may add some overhead."

A standard cannot preclude vendors' ability to provide extensions to Unix, "such as for parallel processing," Johnson said. Whether these extensions would be part of the standard or would hook into the standard remained unclear.

AT&T's "unofficial commitment," according to Unix product manager Clarice Marie Burch, "is to comply with Posix standards as they are adopted. However, right now, there is no adopted standard," she stated.



Unix V

FROM PAGE 23

communicate on a regular basis, he added. "Unix came in here with the promise of making programming easier," Green said. "But to be honest, programmers did not catch on with that. The intended audience didn't just jump in the pool and start loving it. It was the nontechnical users who got involved with Unix. That's where AIM came in — to help nontechnical users."

Although some software conversions were required so that the same spreadsheet package could run on both the VAX and 3B20 machines, Northwestern Bell said the 8600 has not presented it with any major difficulties.

"Understand now that I'm looking at it from a user standpoint. It does what it's supposed to do," Green said. "Users can get in when they want to get in and have good response time."

When compared with the 3B20 system, the VAX runs more efficiently, he added. "The 8600 has bigger capacity and is faster. We can have 96 ports on the 3B20s. One of the machines does have 80 or so ports. But the question is how many concurrent users you can have," Green said.

"If we have 50 concurrent users on the 3B20s as we deploy it here, the response time goes up dramatically — and so does client dissatisfaction. Now, I can hit 50 users on the 8600 and response time is still instantaneous," he added.

Revolution

FROM PAGE 23

• Traditional life cycle methodologies with their cast-in-concrete phases (requirements, design, development) are being replaced with methodologies that promote an iterative, incremental and overlapping approach to both design and development, with heavy user involvement and extensive use of computer-aided tools that support application prototyping.

• Computer-aided design (CAD) tools are being used to automate the tedious job of creating, maintaining and verifying the various graphic representations of systems design (data models, functional decomposition, data flows). CAD tools store this design data in a central respository and can automatically generate systems documentation and development specifications. They also support screen and report definitions that can quickly become prototypes for demonstration of the system's operation.

• Computer-aided programming (CAP) tools are being used to make it easier to generate and maintain applications. These application generators use powerful nonprocedural and procedural features to create efficient, compilable code and simplify data base/data communication interfaces. They can enforce structured coding techniques, support the use of reusable code and also allow for early prototyping of screens and reports that can gradually be expanded and refined into the final system.

• The eventual marriage of CAD and CAP tools will bring automated program-code generation directly from design-phase specifications. These fifth-generation tools support the concept of nonthrowaway development phases. While still a year or two away, vendors are spending millions of dollars to make automated software engineering a reality.

All of these tools are currently referred to as computer-aided software engineering (CASE) tools, which will eventually make use of artificial intelligence. As CASE tools mature, they will bring major shock to the typical DP organization and

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Revolution

CONTINUED FROM PAGE 25

its personnel.

It is easy to sit back and say "That will never happen here" or "It won't affect me." And, in reality, there is probably enough maintenance on traditionally developed applications to allow most senior developers to finish their careers without involvement. But if you're interested in being part of the exciting new automation of our profession, you should educate yourself and position your career to take advantage of the many opportunities that will present themselves.

There are very few MIS executives that have not already decided on, or are not seriously considering, major commitments to these new production software technologies. These commitments can be risky because not everyone in the organization will support them. As a result, MIS executives may ease the organizational impact by splitting DP between old and new technologies. This will help insulate the areas offering the greatest potential for productivity and insure that the effort is not sabotaged by groups that do not support the new trends.

The greatest career opportunities will be in departments using the new technologies. These opportunities include high-visibility assignments, increased recognition, faster advancement, increased salaries, greater challenge and more.

But how do you take advantage of all this? You start by accepting the fact that our industry is about to go through major changes.

Make a concerted effort to stay abreast of evolving technologies and their many advantages. This means taking courses and investigating the new methodologies and tools, including CASE, CAD/CAP, application generators, fourth-generation languages and artificial intelligence. You can even attend many free vendor presentations to learn about new products and their capabilities.

Get involved with departments within your organization that will initially use these new technologies. These include the development center, advanced technology group and software evaluation. Whatever these areas are called in your organization, or even if they are individual projects using the new tools, get involved and stay involved.

Prepare for success and failure

Remember that major changes will usually include successes and failures, and failures are always applauded by the I-told-you-so group that will fight new trends. It is common for programmers and analysts fearful for their jobs to help new technologies fail. The fear of skills laboriously acquired being devalued is a major threat to many in our industry.

These changes will happen. They have to because traditional methodologies and development languages are too slow, too expensive, too labor-intensive and too risky. Just as the assembler programmers of the 1960s didn't think Cobol would make it, many of today's designers and developers don't think that new life cycle methodologies and productivity tools will replace the development methods of the 1970s and early 1980s.

It's clear that many DP professionals have little knowledge of the magnitude of the changes that are occurring in our industry. Don't let the opportunities pass you by. Accept the fact that changes are occurring, investigate the new methodologies and tools and get involved.

Pfrenzinger is president of IMS Consulting, Inc., an Encino, Calif.-based consulting firm that specializes in IBM's IMS DB/DC and CICS/DL/1.

IBM update

CONTINUED FROM PAGE 23

of the mainframe system security software market, according to Computer Intelligence, a La Jolla, Calif.-based market research firm.

But with the latest RACF release, IBM will be going up against a new competitor that has nearly doubled that market share. If the acquistion of Uccel Corp. by Computer Associates International, Inc. is completed, the combined mainframe system security market share of those two entities will be 51%, Computer Intelligence reported.

In addition to the VM/XA SP support, RACF Version 1.8 includes new facilities for both MVS and VM environments, such as improved support of the MVS Time Sharing Option (TSO) and support for the Data Security Monitor under VM.

The new RACF for MVS environments will be available in December, IBM said. It carries a monthly license charge of $841 or a one-time charge starting at $25,230 for smaller processors. Version 1.8 with support of VM/XA SP will be released in March 1988, as will the new operating system, the vendor added. One-time charges start at $8,340 and a monthly license fee is $695.

This month's VM/XA SP announcement included enhancements to IBM's Inter-Systems Facilities (ISF) product Release 1.0. Even though Release 1, announced in January, is not yet available, the vendor also announced Release 2, with availability scheduled for the fourth quarter. The delivery date for Release 1 was moved up from August to this Friday.

Pricing for Release 2 remains the same — $2,100 for a monthly license or a one-time charge starting at $63,000 for each processor — but the new release includes support of VM/SP HPO Release 5.

DATELINE: NEW YORK

Executive confesses to computer collaboration using In-Synch!

John Merson, noted microcomputer industry executive, has confessed to using IN-SYNCH for the purpose of computer collaboration. This is the first public statement in what appears to be the rapid proliferation of IN-SYNCH-based co-computing throughout industry and government.

Collaborating the Easy Way

In an exclusive interview, Merson recounted his actions, from his first co-computing session to his full-blown use of IN-SYNCH. "It started innocently enough," Merson said. "My partner, who was working in our branch office, needed help drafting a proposal for a prospective new client. With IN-SYNCH, we were able to work together, in real-time, on a WordPerfect document as well as a 1-2-3 spreadsheet. We even developed an AutoCAD drawing and threw in some ChartMaster graphs to spice up the proposal. IN-SYNCH made co-computing easy and quick—just as if we were sitting side-by-side. No fax machines. No overnight mail. No special networking. Just our modems and the regular phone lines."

Collaborators Get Carried Away

According to Merson, the computer collaboration didn't stop there. "I guess I got carried away," admitted Merson, "but it was amazing what we could do with IN-SYNCH." Apparently, Merson and his partner next used IN-SYNCH to prepare a slide presentation, using screens selected from the proposal they had developed. These sequenced "slides", including text, drawings, graphs and spreadsheet data, were then shown PC-to-PC (again using IN-SYNCH) to their prospective client. "The prospect had IN-SYNCH on his PC too," continued Merson, "so we dialed him up and delivered our sales pitch online. He loved it! Said it was just the kind of state-of-the-art stuff he needs in today's fast-paced business world. We beat out the competition and got the job."

Collaborating and Proud of It

Merson showed little remorse. "You'd do the same thing if you saw IN-SYNCH. This co-computing is going to catch on like crazy. The possibilities are too hot to ignore. You can co-run all the popular PC software packages. You can transmit and annotate "snapshots" of screen displays. Develop, save and present "slide shows." And IN-SYNCH keeps "minutes" so you've got a complete audit trail of everything you've done. Managers, engineers, programmers, sales people—they're all going to be co-computing with IN-SYNCH. I just did it first. And I'll certainly do it again. And again!"

Poll Shows Collaboration Spreading

Results of an unofficial poll taken by this reporter show Merson's prediction to be proving true. An inside source at MCI stated, "We use IN-SYNCH all the time to analyze important revenue data. It eliminates the need to express diskettes between headquarters and remote branches." And according to a highly-placed source at Rockwell International, "We're using IN-SYNCH for software development as well as for the training of new PC program users." In perhaps the most stunning admission, the president of Engineering Computer Services, Inc. said, "We're using IN-SYNCH with AutoCAD to help designers and clients review architectural drawings, thereby expediting schedules and cutting costs."

Cheers for Collaborators

According to a spokesman for AVTC, producer of IN-SYNCH, the company will not press charges against Merson. "We knew when we released IN-SYNCH that it was the first and only product to bring teleconferencing to the desktop of every PC user. With an innovative product, you've got to expect innovative uses. Off the record, well, frankly we're delighted and we'd just like to say: keep on collaborating!"

EDITOR'S NOTE:

AVTC officials have asked that anyone seeking further information about IN-SYNCH, including the nearest IN-SYNCH dealer, please contact the company at 1-800-641-4461 ext. 85. In New York State, 516-420-8080 ext. 85 or mail the coupon below.

Anyone seeking further information about the escapades of Merson et al, may reach Mr. Merson through his modem. He's collaborating solely via IN-SYNCH these days.

Tell me more about computer collaboration with IN-SYNCH

- ☐ Send me further information
- ☐ Have an IN-SYNCH rep call me
- ☐ Keep me on your mailing list

Please attach your business card or complete the following information.

Name_____

Title_____

Company_____

Address_____

City_____

State_____ Zip_____

Phone ( )_____

AVTC

American Video Teleconferencing Corporation
110 Bi-County Boulevard
Farmingdale, New York 11735
(516) 420-8080

NEW PRODUCTS

Systems software

A journal management system (JMS) software product designed to ensure journal and log integrity for IBM mainframe users has been announced by **Integrity Solutions, Inc.**

JMS/Switch is said to secure on-line data by automatically archiving journal records. In addition, automatic shadow-profile processing may be implemented using JMS/Switch, the vendor said.

JMS/Switch runs on the IBM 370, 4300, 3030, 3080 or compatibles under MVS, MVS/SP, MVS/XA or CICS/VS. It may also be implemented in conjunction with IMS shared data bases with DL/1 data files.

JMS/Switch licenses cost $4,500, including one year of maintenance and enhancement coverage.

Integrity Solutions, Suite 200, 7921 Southpark Plaza, Littleton, Colo. 80120.

A new release of **Techlib/Stacs**, the menu-driven system for corporate and technical libraries, has been announced by **Information Dimensions, Inc.**

The software is said to integrate the Release K enhancements from Basis, the firm's parent Text Information Management System.

Features include two alternate patron-search menus and the ability to enter requests from remote terminals.

The optional Marc tape and direct interface have been enhanced with improved processing statistics and the ability to allow records marked "cancel" to be eliminated during processing. Users can also edit Techlib/Stacs records before they are placed in a holding file for updating.

Techlib/Stacs operates on mainframes and minicomputers including IBM, Digital Equipment Corp., Control Data Corp. and Wang Laboratories, Inc. models.

First-copy licenses start at $18,000.

Information Dimensions, 655 Metro Place S., Dublin, Ohio 43017.

Applications packages

The **CAE Systems Division** of **Tektronix, Inc.** has announced its **Gate Array Worksystem** product featuring automatic performance-driven layout.

The Gate Array Worksystem is said to provide a complete integrated design environment for the creation of circuit designs on specific gate arrays. It uses design automation software to customize a gate array from schematic capture and verification stages through the automatic foundry-endorsed layout. The software runs on Digital Equipment Corp. VAX-based systems and the Apollo Computer, Inc. Domain family of workstations.

Gate Array Workstation costs $70,000.

Tektronix, 5302 Betsy Ross Drive, Santa Clara, Calif. 95054.

An updated release of the **Reader** full-function spelling checker for use with the Foreword word processing system from Motorola, Inc. has been announced by **Legist Automation, Inc.**

Reader runs on any Motorola System 4000 or 5000 running under the MFE operating system and supports up to 10 concurrent users from any terminal.

Version 4.39 includes a browse feature that allows the user to look in the dictionary file for the correct spelling when Reader fails to recognize a word.

Another new feature is the option to designate any character as a letter to be used when scanning for words.

Reader costs $2,250.

Legist Automation, Suite C, 2405 Garden Park Court, Arlington, Texas 76013.

Development tools

Level Five Research, Inc. has released **PRL Version 3**, an integrated expert system tool for use on Digital Equipment Corp. VAX/VMS systems.

PRL Version 3 is said to be capable of accessing data bases without any external processes. It also provides access to any VAX file and is integrated with the VAX EDT.

Features are said to include an object library and a linkable library of utilities. The vendor said PRL Version 3 can also activate any VAX Digital Command Language or process within the expert system shell. It uses the Production Rule Language.

PRL Version 3 is priced from $9,600 to $28,000.

Level Five Research, 503 Fifth Ave., Indialantic, Fla. 32903.

Perennial has announced its **Validation Suite** for the University of California at Berkeley's Unix 4.3 and an upgrade to its Validation Suite for Unix 4.2. It also introduced an upgrade to its C compiler Validation Suite.

The Validation Suite for Unix 4.3 offers testing of system cells, libraries, commands, utilities and CPU performance. The update to the Unix 4.2 version consists of improved socket testing and additional libraries and utilities tests. The update to Perennial's C compiler Validation Suite consists of additional tests for the ANSI standard.

The Validation Suite for the Unix 4.3 version is priced at $15,000 for the source license.

Perennial, Suite 450, 4677 Old Ironsides Drive, Santa Clara, Calif. 95054.

Now the best seller comes in an illustrated edition.

With the WY-85 at left, Wyse authored the best selling alternative to DEC's VT-220. It's fully compatible with the VT-220, but loaded with features that make it even more compatible with the people who use it.

Like a larger 14" screen. Tilt and swivel base. An easier set-up mode.

And while our keyboard is identical to DEC's in layout, they can't touch our touch.

Our new WY-99GT at right further illustrates Wyse's continuing drive to improve on a standard. It features the same advantages as the WY-85. Plus graphics, with full Tektronix 4010/4014 compatibility, and high resolution characters.

Our dual resolution mode lets you retain full VT-220 compatibility and shift from DEC resolution to hi res.

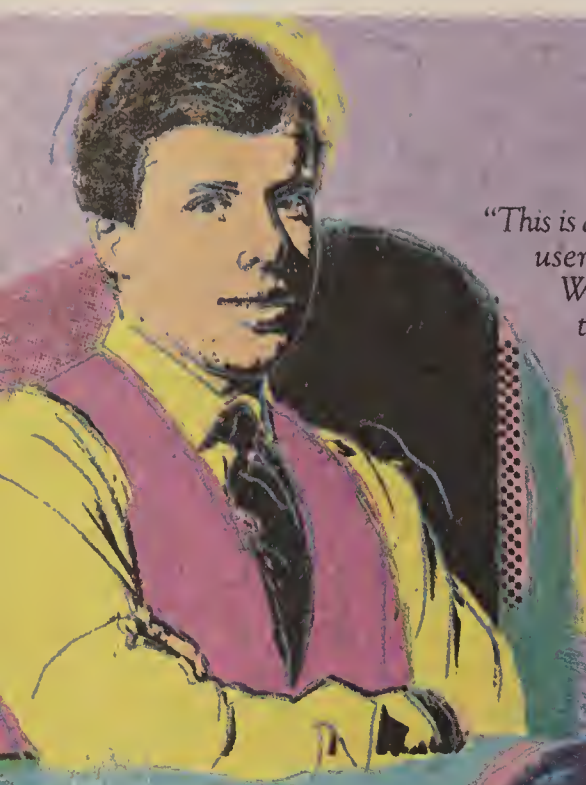
And there's a happy ending. The WY-85 is just $599, the WY-99GT $649. Both are made, serviced, and supported by the company that ships more terminals than anyone but IBM.*

Wyse. When it comes to quality and value in terminals, we wrote the book. For more information, call 1-800-GET-WYSE.

WYSE

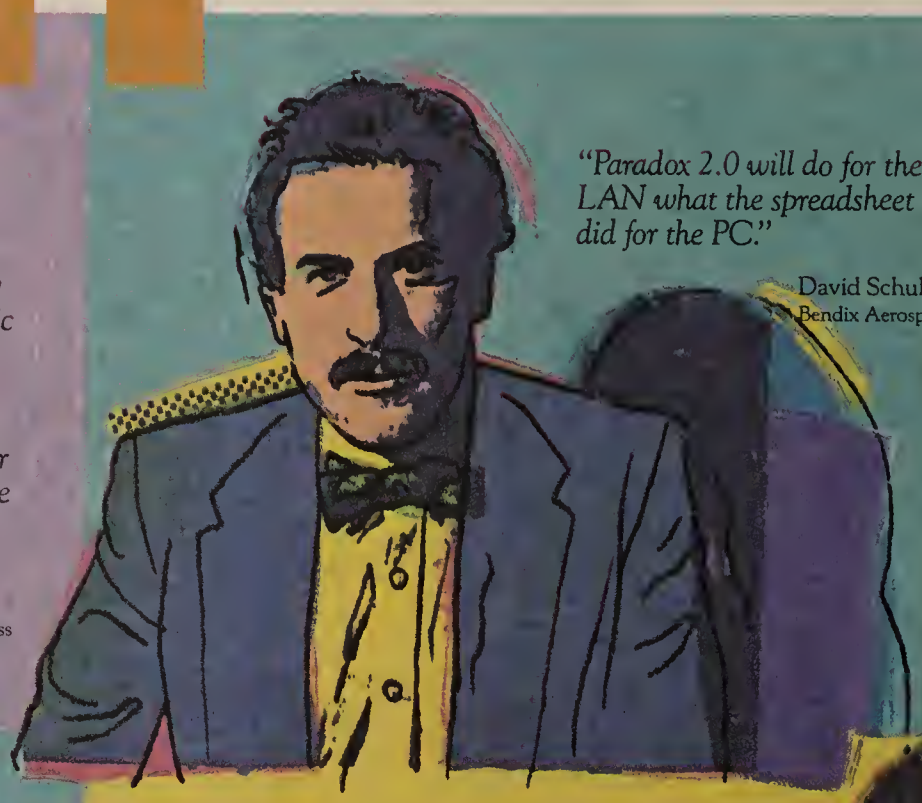
We make it better, or we just don't make it.

How to keep up with



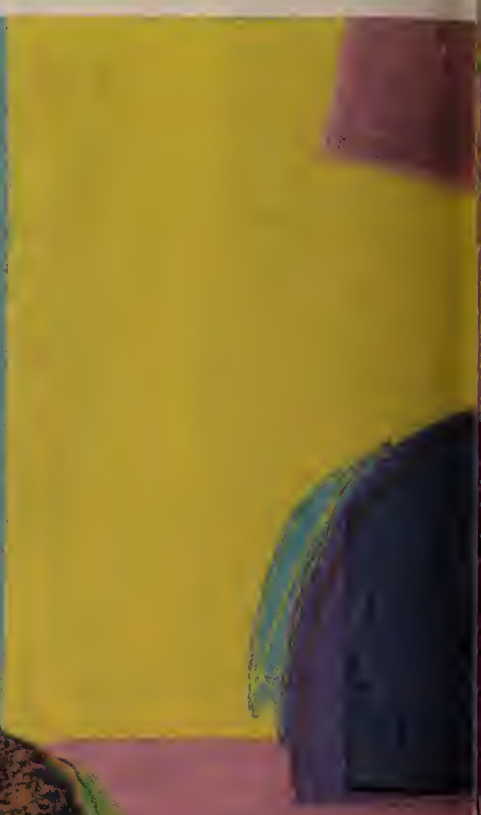
"This is a true multi-user database. When we saw the automatic screen up-dating, you could've scraped our jaws off the floor."

Jim Reichel
Atlantic Business Systems



"Paradox 2.0 will do for the LAN what the spreadsheet did for the PC."

David Schulman
Bendix Aerospace

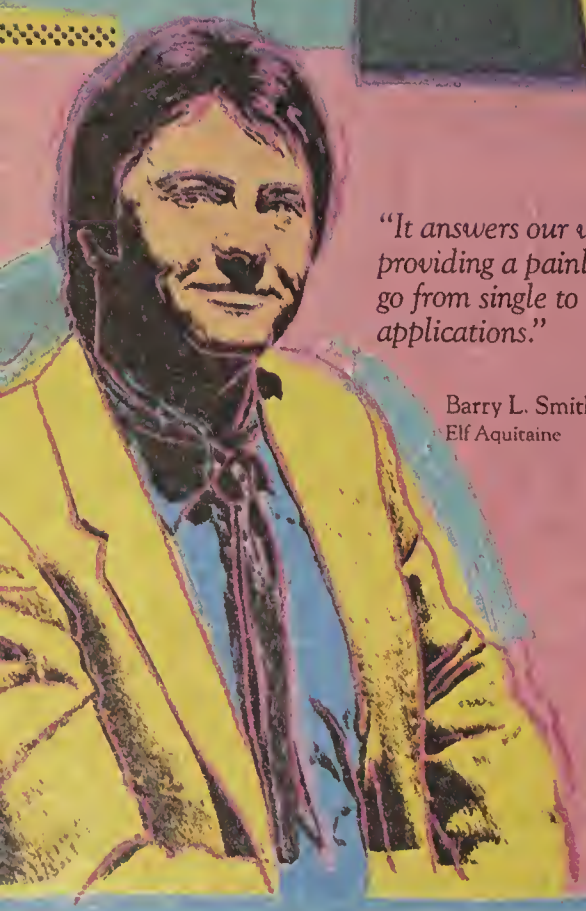


"Paradox 2.0 should make 1987 the year of the network."

John F. McMullen
McMullen & McMullen

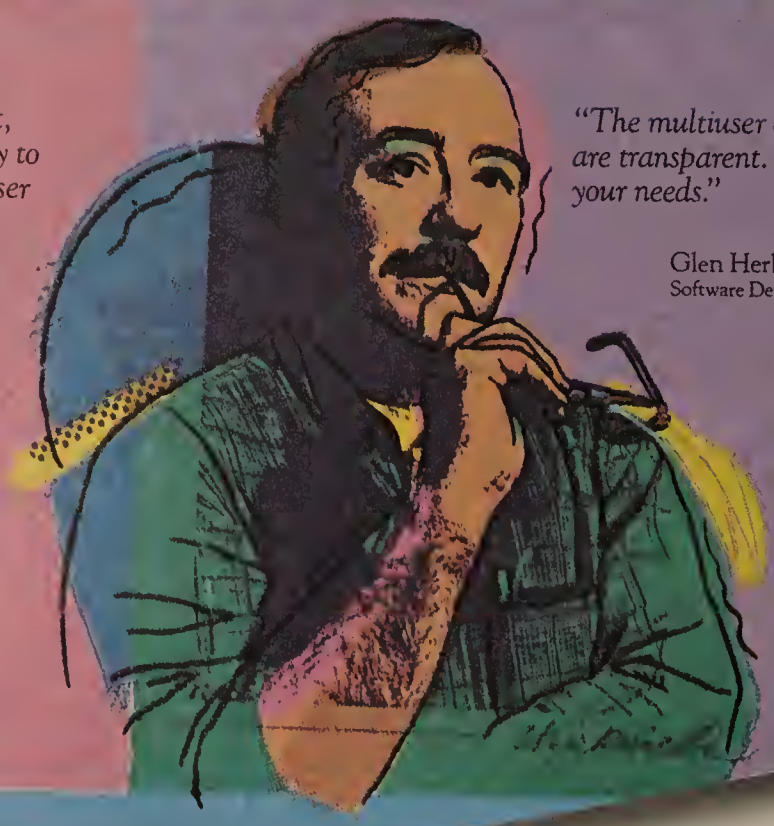
"From a standpoint of ease of use, concurrency and performance, Paradox 2.0 redefines the meaning of 'multiuser'."

Bob Metcalfe
3Com Corporation



"It answers our wish list, providing a painless way to go from single to multiuser applications."

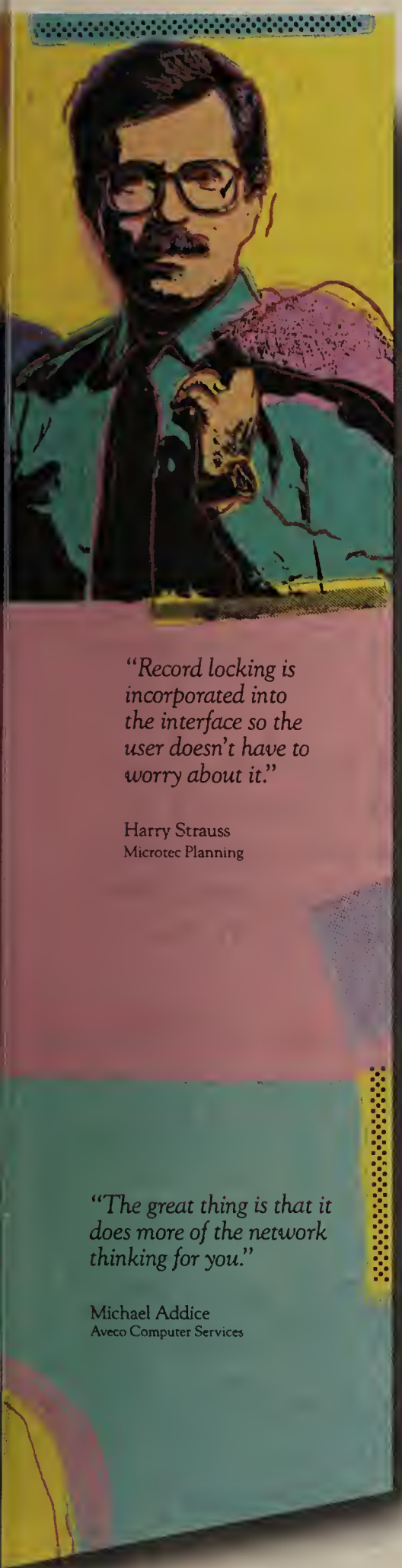
Barry L. Smith
Elf Aquitaine



"The multiuser capabilities are transparent. It adapts to your needs."

Glen Herbert
Software Developer

concurrent events



"Record locking is incorporated into the interface so the user doesn't have to worry about it."

Harry Strauss
Microtec Planning

"The great thing is that it does more of the network thinking for you."

Michael Addice
Aveco Computer Services

Introducing Paradox 2.0. More power for single users, unparalleled power for multiple users.

New Paradox® 2.0 puts the power of the emerging relational database standard into everyone's hands. Single users and multiple users. Now everyone you work with can share information in a way that no other multiuser PC database can offer.

For single users, Paradox 2.0 improves the standard that Paradox 1.1 set for ease of use, speed and power.

For multiple users, Paradox 2.0 offers that same performance plus the unequaled ability to edit, browse, query, sort and report a file concurrently—to get information in real time.

Same time, same network

The multiuser capabilities of Paradox work like an airline reservation system, where people share and update information constantly. Without getting in one another's way. This transparent, concurrent data sharing lets users do things that are impossible in other PC databases.

For example, other databases often lock entire files, or else lock records in a way that makes the data below inaccessible.

Paradox 2.0, on the other hand, lets users edit, browse, query, sort and create reports in the same file at the same time. Records lock automatically, telling others the user's name, and leaving the data below accessible. When revisions are made, the changes appear on all screens in real time. Or at an interval you set. With all these features, Paradox helps more people get more done.

This performance comes without the noticeable speed loss that plagues most multiuser databases. But advanced multiuser capabilities are just some of the enhancements in Paradox 2.0.

Expanded coverage

Paradox has kept its familiar Lotus®-like interface and artificial intelligence to simplify operation and hide complexity from the user. On top of this, we've added more performance for single users, new users and application developers.

Our intuitive "query by example" now has a "Zoom" command that pinpoints data faster. We support up to two billion records, plus EMS and EEMS to speed processing of your largest applications.

Reports have new features like word wrap and multicolumn mailing labels. And thinking ahead, we offer both 3½- and 5¼-inch diskette formats.

For new applications, Paradox 2.0 is also a more powerful tool. We've added 48 new Paradox Application Language commands and functions, sample programs, a data entry toolkit and other helps—many to speed multiuser application development.

Eyewitness report

Study these current events and it's not surprising that companies like American Airlines, First Boston and Mass Mutual are standardizing on Paradox. Not for one reason, but for many.

That's why we're taking new Paradox 2.0 on a cross-country tour, so you can get the firsthand story on the future of multiuser relational databases.

For seminar reservations, call 415-595-4618, extension 155. For an Ansa dealer who can give you a free demonstration diskette, call 1-800-447-4700, Department 252. In the U.K., 01-580-4766.

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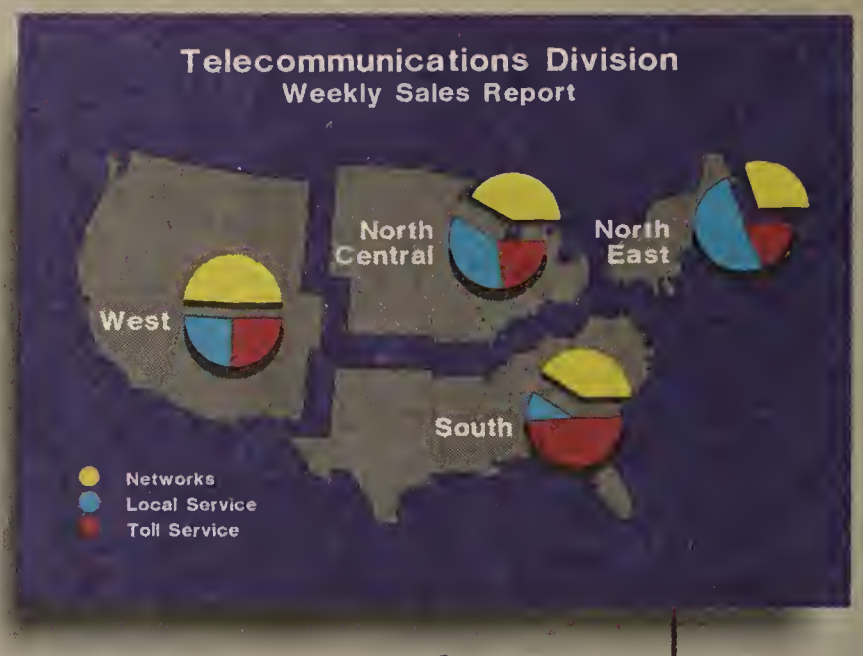

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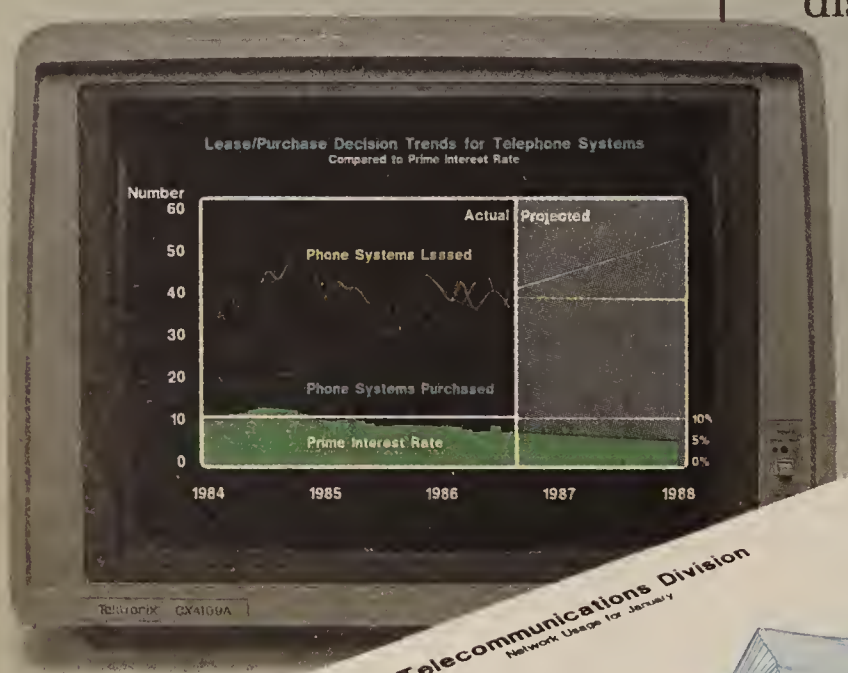

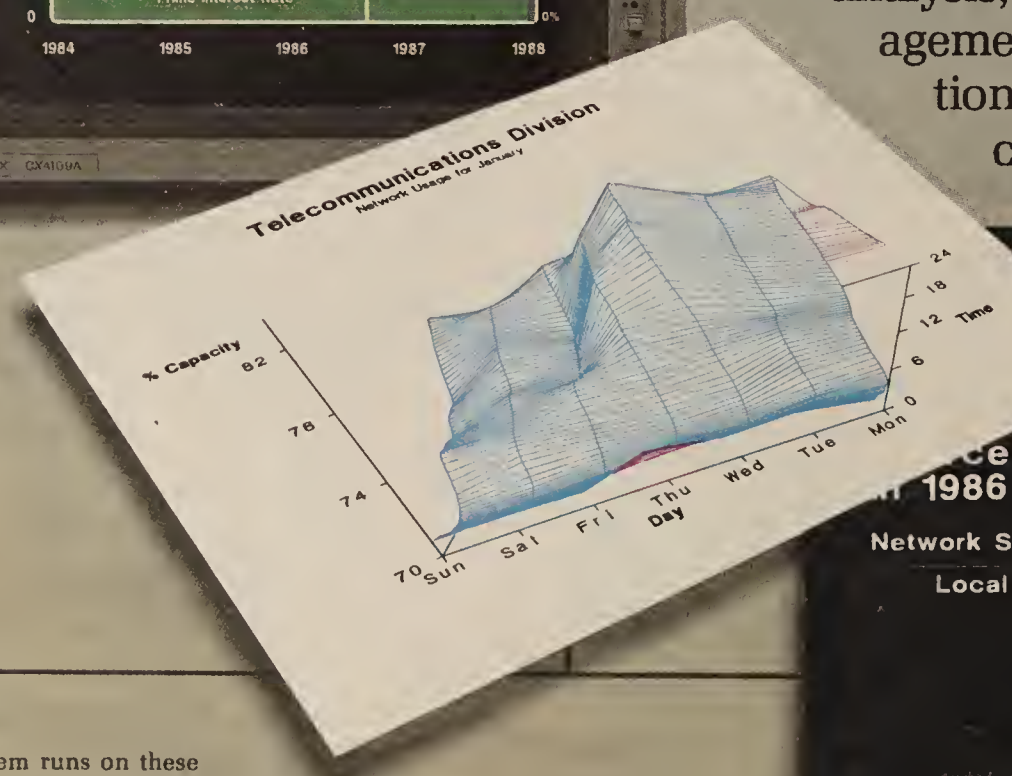

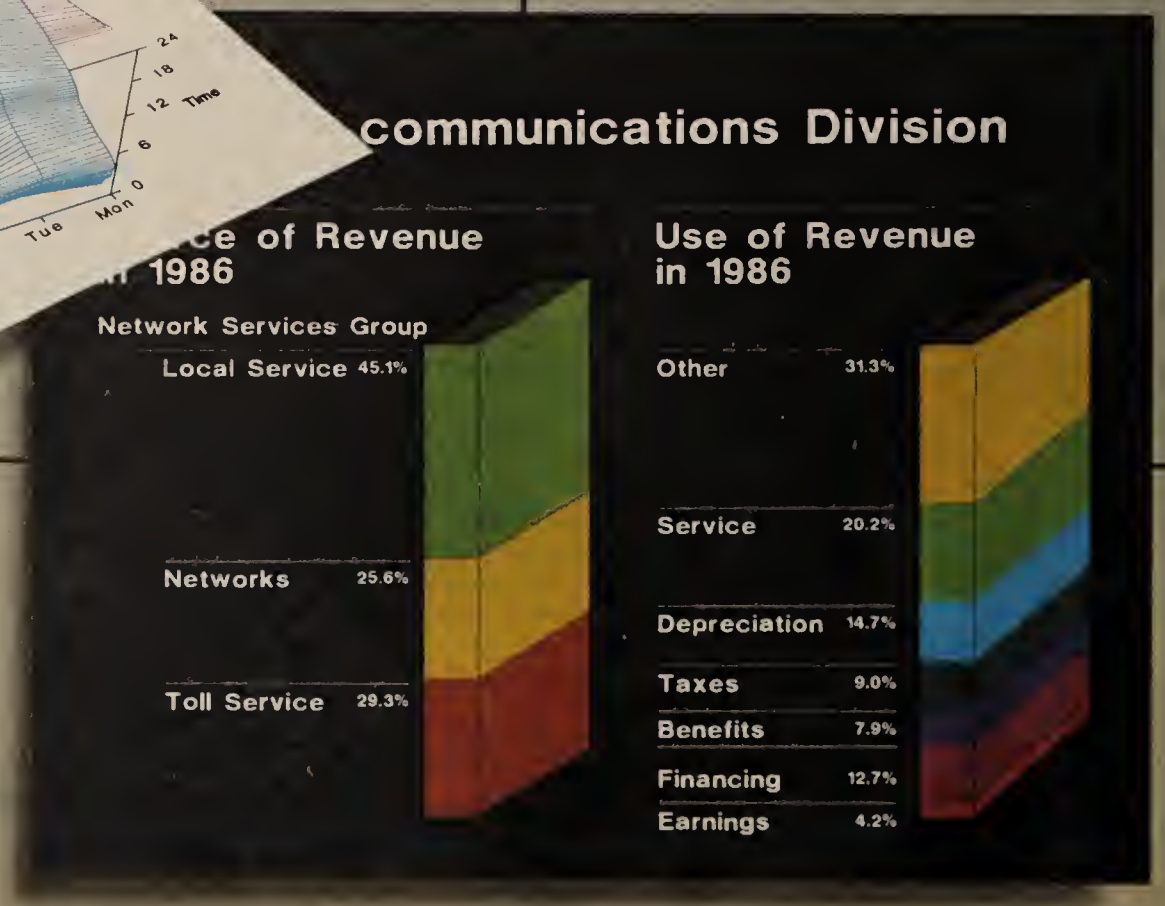

The SAS System runs on these minicomputers: Digital Equipment Corp. VAX™ 8xxx and 11/7xx series under VMS;™ and MicroVAX II™ under MicroVMS™; Prime Computer, Inc. Prime 50 series under PRIMOS®; and Data General Corp. ECLIPSE® MV series under AOS/VS. The SAS System also runs on IBM 370/30xx/43xx and compatible machines under OS, CMS, DOS/VSE, SSX, and ICCF; IBM XT/370 and AT/370 under VM/PC; and IBM PC XT and PC AT under PC DOS. Not all products are available for all systems.

SMALL TALK

William Zachmann

Hardcard 40 a real plus

It is amazing to recall that only four or five years ago, I thought of hard disk drives on personal computers as an expensive luxury.

After all, there was almost always a way to do anything you wanted to do with floppy disks. Besides, relying on a hard disk just seemed like asking for trouble. The darn thing was likely to crash, taking all your data with it. For a long time, it seemed better just to leave the thing alone.

Just as amazing to recall is when I got my first hard disk. It was a huge, expensive, separately housed Tallgrass Technologies 20M-byte disk with a backup tape. Connected to my vintage IBM Personal Computer, it required special software booted off a floppy disk just to get IBM's PC-DOS to recognize its existence. Later, I remembered what a thrill it was to actually be able to boot from a hard disk on a system for the first time.

More amazing still is to realize that in just six years, I am now concerned that I've only got about 10M bytes of free space on my disk. How quickly what only a few years ago was an unjustifiable luxury has turned into barely enough room for the

Continued on page 38

Apple pares release of Mac II

Will ship two per dealer per month until compatibility snags resolved

BY PATRICIA KEEFE
CW STAFF

Macintosh II shortages may continue through the end of the year, according to dealers who reported that Apple Computer, Inc. is allocating two machines per dealership per month.

To make matters worse, orders for the Macintosh II are said to be backlogged as much as seven months.

The shortage is not expected to deter die-hard Apple devotees, many of whom are buying Macintosh SEs as a stopgap to tide them over until they can get Mac IIs, dealers said.

Coupled with a second wave of IBM microcomputer announcements expected in August, however, the shortage may discourage the very MIS directors targeted by the Mac II, those who have not yet decided to buy Apple machines.

"That is exactly the risk Apple faces, and they know that," said Derek Brown, Macintosh product marketing manager for 3Com Corp.

"I imagine they [Apple] are running 24 hours a day trying to get this ramped up. They have a little bit of time [before IBM's announcement] but not a whole lot," Brown said.

An Apple dealer with several stores in the Southwest said Apple has told him several times that his dealership, rather than each outlet, will receive two units a month.

"I have one customer who has committed for five units and another who has committed for seven," the Apple reseller said, adding that he is forced to tell would-be Mac II buyers that he is sold out for the year.

"We've been told to expect two units a month for the next three months," said Michael Ranka, a sales representative with Dardick Corp., a Virginia-

Continued on page 35

Users: 386 operating system buggy

BY DAVID BRIGHT
CW STAFF

Early users of The Software Link, Inc.'s PC-MOS/386 multitasking, multiuser operating system said recently that the product has several serious bugs and suggested that it had been prematurely shipped.

At the same time, however, the users cited several positive features of the software, such as its ability to run multiple spreadsheets simultaneously.

According to The Software Link, PC-MOS/386 is compatible with Microsoft Corp.'s MS-DOS operating system and also takes advantage of Intel Corp. 80386 chips' native 32-bit mode.

'Difficult task'

"The Software Link has an incredibly difficult task," noted Alek Stein, chairman of Worldwide Capital Management Corp. in New York.

Stein said he purchased a copy of PC-MOS/386 because of its multitasking capability, but sent it back when he discovered it would not run his preferred accounting package — Newviews, from Q. W. Page Associates, Inc. in Toronto.

He said it was his impression that The Software Link sent the operating system out before it was ready because the firm had already committed to shipping within a certain time frame.

Bugs reported by other users and a vendor of mail-order systems have included an inability to support the internal tape drive in Compaq Computer Corp.'s Deskpro 386 system, problems installing application packages on a hard disk and an inability to run one LISP interpreter with an IBM Enhanced Graphics Adapter (EGA) monitor because of certain EGA memory dependencies. Product marketing coordinator Jeff Weyrich said the majority of the problems will be taken care of in a free upgrade of the operating system but that he does not know when it will be available.

'At least 95% compatible'

"We still expect to hit our original goals for compatibility," he stated. "We should be at least 95% compatible with all [MS-] DOS business applications."

Mouse support will also be added in the next release, Weyrich added. The operating system is compatible with Microsoft's Mulisp LISP compiler, Weyrich said, adding that he was not familiar with the Newviews program.

Gary Robertson, director of sales and marketing, claimed that The Software Link has re-

Continued on page 39

Softguard unloads VM/386

BY DAVID BRIGHT
CW STAFF

SANTA CLARA, Calif. — Citing a drain on its resources Softguard Systems, Inc. recently announced that it has agreed to transfer the rights to its VM/386 virtual machine operating system project to Intelligent Graphics Corp., also in Santa Clara.

VM/386 was designed to allow the concurrent operation of multiple operating systems, including several copies of Microsoft Corp.'s MS-DOS, on Intel Corp. 80386-based machines. Modeled after IBM's VM operating system, Softguard said VM/386 will serve as a host to guest operating systems running in the 80386 microprocessor's virtual mode.

Softguard announced VM/386 last July and had planned to make it available sometime this year, it said. In addition to the drain on its resources, Softguard said it also decided to transfer the operating system technology because of "extreme volatility" in the 80386 market and a need to concentrate on its other products.

Inside

Vendors skirt IBM roadblocks, prep PS/2 boards

BY JAMES A. MARTIN
CW STAFF

Third-party board vendors are forging onward with plans for IBM Personal System/2 enhancement cards despite concerns about the limitations of IBM's Micro Channel architecture.

Although board makers initially were stymied by reported IBM delays in providing needed detail on requirements to connect to the Micro Channel, several vendors said last week that IBM has moved to provide that information.

AST Research, Inc.confirmed its plans to ship a multifunction version of its Advantage/2 card in August.

The Advantage/2 I/O board, which has not been formally announced, reportedly combines 2M bytes of random-access memory (RAM) with additional serial ports for the Micro Channel models of the PS/2.

There has been concern recently that multifunction boards would not easily work within the Micro Channel architecture.

The Micro Channel setup program is said to be one-dimensional in concept, which can create conflicts when trying to address the ports on a multifunction card [CW, June 8].

AST said it has bypassed that limitation by assigning one Micro Channel identification number to each port on the multifunction card, a method also being employed by Quadram Corp. for its multifunction card.

Recommend ID numbers

In order to ensure that the Micro Channel interfaces properly with add-in cards, IBM has recommended that third-party developers assign IBM-approved ID numbers to their cards.

But AST, along with other vendors, said it spent several frustrating weeks attempting to obtain those ID numbers for both single- and multifunction boards. AST had said it might have to delay shipment of Advantage/2 until IBM could issue the identification numbers [CW, June 1].

An AST spokesman, however, said last week that IBM had finally come through and that "we now have ID numbers coming out our ears."

"At the beginning, we had a few bugs, and we weren't getting back to callers as quickly as we should have," an IBM spokesman explained. "But we've worked through that problem, and we're taking care of calls on a timely basis now."

Could not wait

Not all vendors waited for IBM to assign or approve ID numbers. Orchid Technology, Inc. was the first to ship a 2M-byte memory card for the PS/2 Models 50 and 60 by using the same ID number IBM had assigned to its own memory expansion card, the Intel Corp. 80286-based Expanded Memory Adapter.

"The Orchid Ramquest 50/60 is, in essence, a clone of IBM's own card," said Bill Berk-

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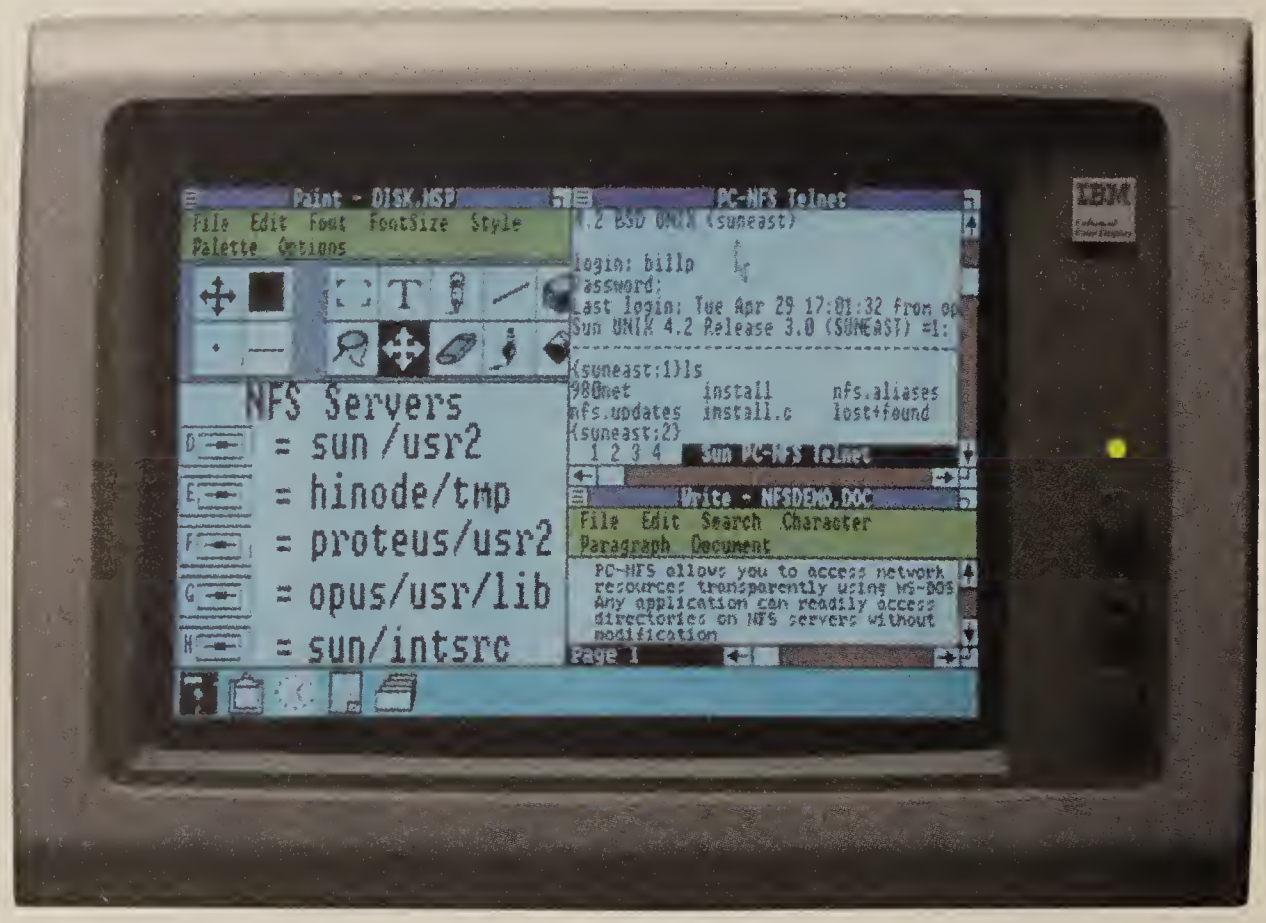
How to avoid getting LAN locked.



PC LANs can only take you so far.

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But it needn't be that way any longer. Thanks to PC-NFS.™

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PC-NFS is a networking product for IBM PCs and compatibles that gives your PCs access to a variety of computer systems, large and small. PC-NFS is based on our industry standard Network File System (NFS™), so it can connect your PCs to systems from any NFS licensee.

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With PC-NFS, your PCs can share files, printers and other peripherals on systems of all shapes and sizes.

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At the same time, PC-NFS has all the tools to keep confidential files just that.

A GATEWAY TO THE REST OF THE WORLD.

Now your personal computing needn't be limited to your personal computer.

Because the computing resources of your entire company are open to you.

You also have terminal emulation capabilities built in, and using a Sun workstation as a gateway, you can access other computer networks, such as DECnet or IBM SNA.

PC-NFS also offers a standard programming interface and Sun PC-NFS Programmer's Tool Kit so you can develop your own applications to run across the network.

It's all part of our grand design to turn your network of computers into a *network that is a computer.*

So why don't we get together?

Call us at 1-800-334-7866 for more information on PC-NFS and Sun's Open Systems Network.

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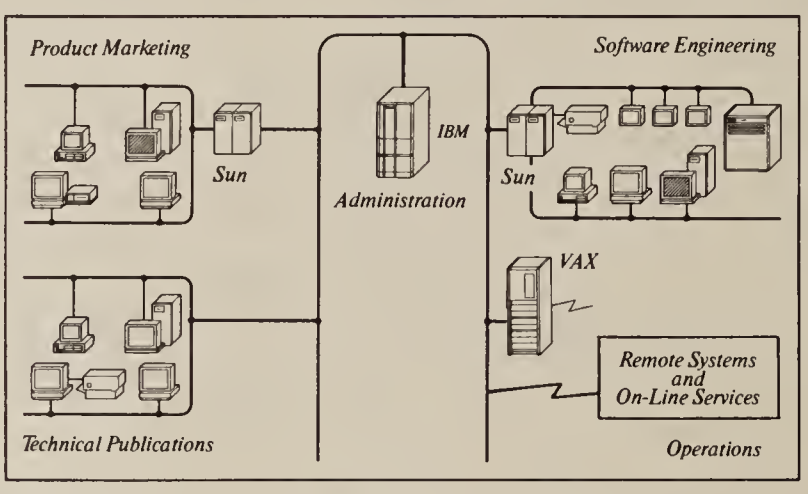

With PC-NFS, PC users can transparently access all the computer resources in the company, across different operating systems, different software, even different networks.

sun microsystems

The network *is* the computer.

Mac II

CONTINUED FROM PAGE 35

based Apple dealer. Ranka said he is hoping Mac II production will be ramped up by September.

Mac II incompatibility with current Apple and third-party Macintosh software is partially responsible for the shortage, according to some dealers and analysts who blame the Mac II's Motorola, Inc. 68020 processor and new system software.

Came as a surprise

"Oh yeah, that's definitely the case, and it's coming as a surprise to a lot of people," Brown said.

For example, dealers said Macpaint, Macwrite and Macterminal will not work with the Mac II; nor will 3Com Corp.'s Etherseries Enhanced. Users who want to run Microsoft Corp.'s Excel will have to get the latest release, Version 1.04, Brown said.

Aware of the criticism, Apple recently issued a release several pages long that lists software compatible with the Mac II.

"Apple is trying to work out these problems as they go into production," said Robert Clarke, vice-president of marketing with The Seybold Group, Inc. in San Jose, Calif. "It's unavailable today because they don't want to push too much out there until they figure out what's wrong."

Apple reportedly angered second- and third-tier software developers by taking longer than usual to make the new product available for development purposes, according to dealers and analysts.

"Mac IIs were not widely available in the development community," Brown said. The network vendor, which typically might have three prototypes, is "chugging along" with one Mac II issued months ago, he added.

And since Apple reportedly made several revisions in the Mac II's read-only memory (ROM) right up until the product's time of release, developers like 3Com, which received evaluation units months ago, may not be working with the latest version. "It exacerbates the problem," Brown said.

Apple's efforts to test its software and revisions are hampered by the scarcity of Mac IIs within Apple itself, Clarke claimed. "Even their market research group, with its own testing lab, does not have any significant number [of Mac IIs]," he said.

The waiting game

Seybold has been waiting since June 1986 to run tests on the Mac II under contract with Apple, Clarke added. "We were told we'd have 12 Mac IIs by mid-December. Here it is June, and we don't have one," he said.

Since the machines are in very short supply and there are few users, any current software incompatibilities are considered by some dealers and analysts to be more of an inconvenience than anything else.

But it will become a problem during the next two months if software updates are not made widely available, Brown said.

Observers said they expect that by the time the Mac II begins to ship in quantity, developers and Apple will have resolved incompatibility problems either through ROM fixes or software patches.

C. Itoh laser printer sights general business

Unit offers upward path for desktop publishing, runs popular applications

TORRANCE, Calif. — C. Itoh Digital Products, Inc., best known for its terminals and dot matrix and daisywheel printers, recently introduced a low-priced laser printer that it said is targeted at general-business applications.

According to C. Itoh, the printer should appeal to low-end system users and provide an upgrade path for desktop publishing and other sophisticated applications.

The Jet-Setter laser printer, priced at $1,795, prints at a speed of 5 page/min at a resolution of 300 dot/in.

The Jet-Setter comes with 512K bytes of memory, expandable to 2M bytes; Hewlett-Packard Co. Laserjet Plus emulation; and parallel, serial and RS-422 interfaces, according to C. Itoh.

The vendor said the laser printer works with nearly all popular software packages currently on the market and is suitable for a wide range of business applications, including letters, reports, spreadsheets, newsletters, catalogs and customized forms. Optional emulation cartridges for the Diablo Systems, Inc. Diablo 630 and Epson America, Inc. FX-86E are priced at $159 each.

Also optional are 11 font cartridges, ranging in price from $149 to $199. Two cartridge slots on the front of the printer accept two font cartridges at a time or one emulation cartridge and one font cartridge.

Because the printer uses belt, rather than drum, technology, the toner cartridge can be replaced independent of the belt, resulting in a cost savings, the company said.

Kits with four toner packs are priced at $59.

Not every software engineer knows about the new ProKit*WORKBENCH.™

Finally, integrated CASE technology for more accurate results.

Trying to manually develop today's strategic systems without wasting time and money can sometimes be a real shocker.

Now there's new ProKit*Workbench, the premier integrated CASE (computer aided software engineering) tool that fully automates the application of structured techniques for the planning, analysis and design phases of system development. This automation is unique because, with ProKit*Workbench, software engineers need only enter data once for it to be stored and accessible systemwide. Now engineers can experience consistency and completeness like never before, because ProKit*Workbench finally transforms system development into a predictable and repeatable process with accurate results.

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Call us at 1-800-325-1087, and we'll give you more information or a demonstration of how ProKit*Workbench can take the horror out of system development.

MCDONNELL DOUGLAS

Hardcard 40

CONTINUED FROM PAGE 33

next few months.

Today, personal computers without hard disks are the sort of things that get handed down to the less privileged souls like secretaries and the kids. But it's getting even tougher to give them away these days.

Most kids and secretaries have enough computer literacy now to demand a large number of fixed-disk megabytes for their systems. Before long, floppy-disk systems won't be good for anything but tax deductions from charitable contributions.

A ray of hope for floppy disk-based systems, however, has emanated from Plus Development Corp. in Milpitas, Calif., since 1985. That was when Plus introduced the first 10M-byte Hardcard, a Winchester disk on a card, for the IBM PC and compatibles. That was followed, in June 1986, by the Hardcard 20, which quickly made Plus a leader in supplying hard-disk capacity for personal computers.

Yet more disk storage

Plus's latest product, the Hardcard 40, which offers an even higher capacity, was designed to turn older floppy disk-based systems into hard-disk systems. Even more important, however, the Hardcard 40 offers a very reliable means of storage for users who are quickly outgrowing the disk capacity of more powerful Intel Corp. 80286- and 80386-based systems.

While the primary use of earlier Plus Hardcard products was for upgrading floppy disk-based systems, I suspect that the primary demand for the Hardcard 40 will be for expanding the capacity of systems that already have a 20M-byte or larger hard disk. The Hardcard 40 is an excellent way for users of more capable systems to obtain more disk storage to meet expanding applications requirements.

With a list price of $1,195, the Hardcard 40 offers 42.26M bytes of formatted storage with a 35-msec access time on an add-in card that will fit any standard IBM PC, PC XT, AT or compatible expansion slot.

Portable and desktop use

The Hardcard 40 draws on only 8W of power with a mean-time-between-failure rate of 40,000 hours.

With the ability to withstand 100 times greater than normal gravitational force, the Hardcard 40 is an extremely attractive product for both portable and desktop systems.

The Hardcard 40 is not only fast and reliable but also quite straightforward to install. I have to confess that I had some problems at first, but that was almost entirely because of my constitutional unwillingness to read directions. The directions are both detailed and specific and, if followed carefully, ensure easy installation.

From my perspective, I would have preferred a fast-path guide to installation for an experienced user similar to the "Hackers Guide To Installing The Above Board PS" that Intel provides with its multifunction expansion board.

Plus's installation instructions were so detailed that I just didn't have the patience to read through them. A short explanation of what must be done and why would have been nice.

On the other hand, those who follow the instructions as written should not encounter the kind of problems I encountered in ignoring them.

What's more, despite my trial-and-error approach to installation, neither my NEC Corp. APC IV system nor the data on my previously installed hard disk suffered as a result of my efforts, which is surely a tribute to the good job Plus had done in making installation safe for the user.

At a little more than $28 per megabyte, the Hardcard 40's list price is higher than that of most low-cost mail-order alternatives but is highly competitive with prices from IBM or Compaq Computer Corp.

Moreover, the advantages of reliability, portability and the ease of hard-disk expansion by means of an add-in card significantly add real value to Plus's Hardcard 40.

Last but not least, Plus's disk-on-a-card approach is really the only way to obtain expansion-disk capacity for a product like the IBM Personal System/2 Model 30, which has no room in the chassis for an additional hard disk. Because it was built for the PC, XT and AT bus, the Hardcard 40 cannot be used with the other PS/2 models.

A later version for IBM's Micro Channel adapter bus, however, may be the only way users will ever economically get around the 80-msec 20M-byte disk that is featured on the PS/2 Model 50.

Zachmann is vice-president of research at International Data Corp.

System buggy

CONTINUED FROM PAGE 33

ceived tremendous feedback from customers so far and that only two or three glitches have been reported.

According to Robertson, the Deskpro 386's tape drive can be used if the interrupt system is set up as documented by The Software Link. While Weyrich had declined to set a time frame for the next release, Robertson stated that it would be coming in about 30 days.

Despite the bugs, users said they were impressed by some of PC-MOS/386's capabilities.

"The multitasking function is excellent, very easy to do," said Marc Joffe, senior programmer analyst at Wall Street Trust in New York. Joffe, who had noticed the tape drive problem, said that he had run two Lotus Development Corp. 1-2-3 sessions simultaneously with no problems.

Positive features

Other positive features Joffe mentioned were the ability to set hard-disk partitions for more than 32M bytes, the use of the Up arrow key for accessing several previous commands and well-detailed documentation.

Joffe said he originally ordered the five-user version of PC-MOS/386 as a substitute for Novell, Inc.'s Netware operating system but had to implement Netware when The Software Link delayed the release of its product.

Worldwide Capital Management's Stein said he may give the package another try if The Software Link manages to get the bugs out.

"Breaking that 640K barrier [of MS-DOS] will be a godsend," he said.

Many managers frustrated by the limitations of MS-DOS and with the wait for Microsoft's MS OS/2 operating system, which takes advantage of Intel's 80286 but not the 80386, have expressed interest in PC-MOS/386 as a possible alternative to Microsoft's offerings.

More than 2,500 orders have been filled since shipments began four weeks ago, and shipments should reach 40,000 packages by the end of the year, the company claimed.

PS/2 boards

CONTINUED FROM PAGE 33

man, Orchid's product manager. "IBM's technical reference manual states that if you're going to be compatible, you have to be identical in design to their card. So, we chose to use their number, which our engineers retrieved after several days of work, based on this information."

Berkman added that, in the meantime, Orchid has contacted IBM and is awaiting an answer regarding the use of the ID numbers.

An IBM spokesman, when asked about other board vendors using IBM's own Micro Channel identification number, said only that IBM is not requiring vendors to have authorized numbers.

"But we're suggesting that if they coordinate through us, it will eliminate any possibility of duplication," he added.

Share of problems

Other vendors have had their share of problems developing and releasing add-in products for the PS/2 line. Tecmar, Inc. in Solon, Ohio, had originally planned to announce at Comdex/Spring '87 a multifunction board combining 2M bytes of RAM and two serial ports on the main board with an additional 2M bytes available on an optional daughterboard.

Instead, Tecmar said it is releasing two single-function boards: one memory and one I/O.

Tecmar split up the functions on its planned multifunction card because "we can't wait around for IBM to tell us what to do," said Dan Lucarini, director of marketing.

Tecmar's Microram/2 card for the PS/2 Models 50 and 60 is set to be available July 1, while the multifunction version should be ready in early fall, Lucarini said.

Meanwhile, AST's multifunction card should beat to market those from Tecmar and Quadram. The latter's Quadboard PS/Q 2M-byte RAM and I/O board is scheduled to ship in October.

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NEW PRODUCTS

Systems

The **FTC-286/10**, a 10-MHz, IBM Personal Computer AT-compatible system equipped with an Intel Corp. 80286 processor, has been announced by **Franklin Telecom**.

The FTC-286/10 is said to run on all Novell, Inc. and 3Com Corp. networks. It features three 8-bit and five 16-bit slots, as well as space for one full-height and three half-height peripherals.

The FTC-268/10 is priced at $1,850.

Franklin Telecom, 733 Lakefield Road, Westlake Village, Calif. 91361.

Tandon Corp. has reduced the prices on its line of IBM Personal Computer and PC AT compatibles.

Tandon also announced that three models of its IBM PC XT-compatible **PCX family** now include a serial card and dual-video adapter as standard and that five AT-compatible **PCA models** now feature serial and parallel capability and 1M byte of random-access memory.

New pricing ranges from $899 for the twin-floppy PCX-2 to $3,699 for the 70M-byte hard-disk and single-floppy PCA-70.

Tandon, 405 Science Drive, Moorpark, Calif. 93021.

Software applications packages

Electronic Text Corp. has announced **Wordcruncher**, a text-retrieval software program designed for IBM Personal Computers and compatibles.

Wordcruncher is said to identify and gather specified data in Microsoft Corp. MS-DOS ASCII text files. If the data is not in electronic form, it can be entered using an optical scanner from most printed sources. Wordcruncher can also work with voice synthesizers, the vendor said.

Users can search a file for words, phrases, lists of words, substrings and contextually defined groups of words.

Wordcruncher is said to allow unlimited text size. Smaller texts can be merged into larger texts up to about 500M bytes.

Wordcruncher costs $299.

Electronic Text, 5600 N. University Ave., Provo, Utah 84604.

Computer Associates International, Inc. has announced the **Construction Solution**, the first in a series of accounting software solutions focusing on the accounting requirements of specific industries.

The Construction Solution is a group of the vendor's Easy Business Systems' accounting modules selected to meet the accounting requirements of the construction industry. The products include job costing, financial reporter, payroll, inventory control and analysis, easy filer and report writer. A windowing system is also available.

Each module is priced individually, ranging from $149 to $795.

Computer Associates International, 2195 Fortune Drive, San Jose, Calif. 95131.

Printers/Plotters/ Peripherals

An 8 page/min. laser printer featuring Hewlett-Packard Co. Laserjet Plus emulation has been announced by **Office Automation Systems, Inc.**

Called the **Express Series II**, the printer offers HP font cartridge capability, 640K bytes of memory and a range of emulations, including Epson America, Inc.'s FX-80. Other features include full-page 300 by 300 dot/in. resolution and resident RS-232 and Centronics Data Computer Corp. interfaces.

The Express Series II is priced at $2,295. Office Automatic Systems has also announced a price reduction for its Silver Express printer to $2,795.

With HP cartridge capability, Silver Express now costs $2,995. With 1.2M bytes of memory, the printer costs $3,295.

The Express Series II *laser printer*

Office Automation Systems, 8352 Clairemont Mesa Blvd., San Diego, Calif. 92111.

The MTS-2500, a touch screen designed for 25-in. diagonal displays, has debuted from **Microtouch Systems, Inc.**

The MTS-2500 is an analog-capacitive touch screen with a resolution of up to 1,024 touch points on each axis. It is made of solid glass with a resistive coating. It provides a touch resolution of up to 1,024 by 1,024 points in the calibrated screen area and allows light transmission of up to 85% of the display light.

The 25-in. MTS-2500 is priced at $1,395 in single-unit quantities.

Microtouch, Ten State St., Woburn, Mass. 01801.

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DEC VAX/VMS—Digital Equipment Corporation.

COMMUNICATIONS SERVICES VIA ITT

DATA STREAM

Stephen J. Randesi

DDM to pave IBM's access

Distributed Data Management (DDM) is emerging as IBM's primary strategic architecture for remote-file access in Systems Network Architecture (SNA)-based networks. Although DDM was not part of IBM's recent Systems Application Architecture (SAA) announcement, it will probably be added in the near future. It fits nicely into the SAA scheme by providing a standardized, consistent means of file access across the range of IBM strategic systems addressed by SAA — mainframes, departmental processors and personal computer systems.

The primary reason that DDM exists, and SAA for that matter, is because these various IBM product families are incompatible. Because these systems all have different hardware architectures and operating systems, IBM must provide additional software on each system in order to achieve compatibility. This additional software acts as a translator between systems whenever functions are distributed across them. This is exactly what DDM does in the case of remote access to record-oriented files that are distributed throughout a network.

The major benefit that DDM provides is transparent access to data that is physically located

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EDS ends bid for federal net

Blames recent contract changes in leaving war for telecom system

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Electronic Data Systems Corp. (EDS) recently pulled out of the fierce bidding competition for a $4.5 billion federal communications network contract, citing legal and regulatory hassles involved in the government contract.

Penny Pasquesi, a spokeswoman for Dallas-based EDS, blamed recent changes to the contract documents that allegedly favor rival bidder AT&T, disruptions in the bidding process and the prospect of lengthy litigation after the contract is awarded for the withdrawal. She said all of these problems contributed to the decision to stop the costly work of developing a bid proposal.

Analysts said another factor in the decision may have been the widely held view that the EDS-led team was the weakest of three contenders for the Federal Telecommunications System (FTS) 2000 contract.

"It saves them from losing," said George Dellinger, telecommunications analyst for Washington Analysis Corp.

The nearly last-minute decision by EDS was a blow to U.S. Sprint Communications Co., the long-distance service that teamed up with EDS to bid for the coveted 10-year contract, analysts said.

Sprint is disappointed by EDS's pullout but shares its concerns about the contract, according to Syd Courson, a spokesman for the Kansas City, Mo.-based firm. He said Sprint is considering whether to bow out or regroup to bid as a prime contractor.

Bid proposals are due July 30 at the U.S. General Services Administration (GSA), which is handling the procurement and

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E-mail to grow rapidly through '91

BY DONNA RAIMONDI
CW STAFF

Users will benefit from competition and interconnection among three fast-rising segments of the electronic messaging market, according to "Electronic Messaging 1987," a report on service bureaus released recently by Link Resources Corp. in New York.

In 1986, approximately 900 million messages traveled via the four main messaging mechanisms: service bureaus, telex, integrated office systems and personal computer local-area networks (LAN), the report found.

The service bureau market, which is dominated by such services as Telenet Communications Corp.'s Telemail, Western Union Telegraph Co.'s Easylink, General Electric Information Services Co.'s (Geisco) Quik-Comm and MCI Communications Corp.'s MCI Mail, will expand 26% per year, from $237 million in 1986 to $758 million in 1991, the report says.

While the number of messages sent through service bureaus will increase from $210 million in 1986 to $1.6 billion in 1991, the number of subscribers is expected to grow much faster. The just under 800,000 subscribers of 1986 should mush-

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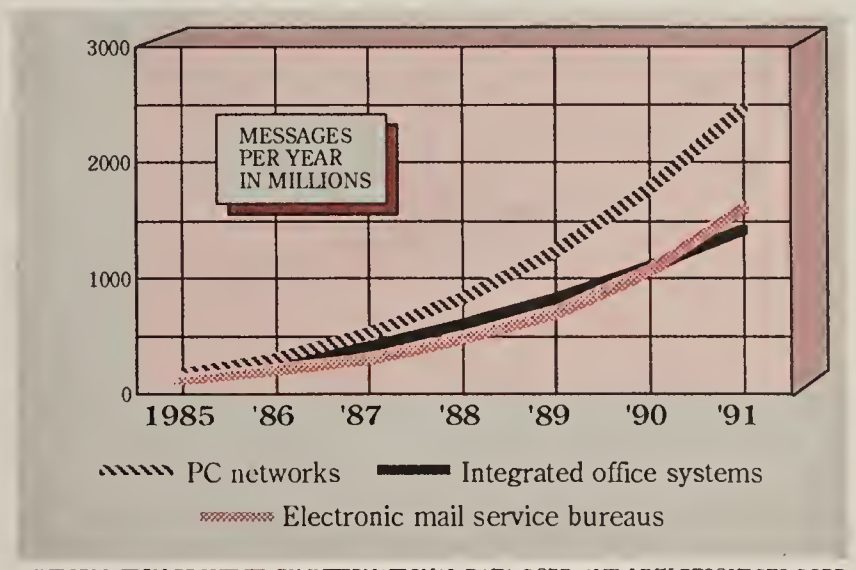
Electronic mail on the rise

Service bureaus, PC networks and integrated office systems both compete and connect in the electronic mail arena



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP. AND LINK RESOURCES CORP.
CW CHART

AT&T says 56K service underused

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Claiming that its Switched 56 Digital Service is not generating enough revenue to recover fixed costs, AT&T has filed for permission to set minimum usage charges for the 56K bit/sec. digital transmission offering.

The tariff, which would take effect July 18, sets minimum usage at $75 per line per month for special-access customers and $20 per line per month for digital switched-access customers.

Special-access customers use dedicated lines to link up with AT&T's service over the local loop; digital switched-access customers access AT&T's service via a comparable offering from divested Bell operating companies. Switched digital 56K bit/sec. services are currently available in only a few local-access and transport areas.

Customers whose usage of a given line does not come up to the minimum requirement will be billed the remainder of the charge by AT&T.

The proposed tariff "is intended to assist in the recovery

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Inside

Racal-Vadic links MDS II to Netview/PC

Says controller, software enable users to integrate network management, dial-up modems

BY PATRICIA KEEFE
CW STAFF

MILPITAS, Calif. — Racal-Vadic recently announced two products linking its MDS II network management system to IBM's Netview/PC. The VA9010 System Controller and the Uplink/N software package will enable customers to integrate network management for dial access within the Netview environment, Racal-Vadic said.

MDS II is said to provide network management for dial-access and leased-line modems and related data communications products. All management activities of MDS II, including alert reporting, operating statistics and the human interface, are available through Netview/PC, Racal-Vadic said.

"This is a major step in our program to bring sophisticated network management to the world of dial-up access modems," said Darrell Sell, vice-president for system products.

The IBM Personal Computer-based VA9010 System Controller replaces the VA9000 and reportedly can manage a network of 16,000 modems located anywhere in the world. Uplink/N is a software product that runs in IBM's PC-DOS partition of Netview/PC and, together with the VA9010, provides the interface between MDS II and Netview/PC.

The new products reportedly integrate remote management and control under the Netview umbrella. Functions such as configuration, alarm reporting, busy out, diagnostics, inventory control and system security are linked into Netview/PC. MDS II modem and chassis alarms are converted to Alerts for Netview/PC and can be reported to Netview, the vendor said. Operating statistics and event data can also be sent through the Distributed Data Management Facility from Netview/PC to an application on the host.

The system operator can call up the MDS II controller's main menu from Netview/PC and carry out all the network maintenance functions that can be accomplished from the VA9010 System Controller. The system can be configured with identical human interfaces at the system controller and Netview/PC, the vendor said.

The VA9010 System Controller, which consists of software and two communications processor boards for an IBM PC AT environment, is scheduled to be available in the first quarter of 1988 and is priced at $4,000. An upgrade kit for current VA9000 users is also set to be available in the first quarter, as is Uplink/N, which will cost $1,000, Racal-Vadic said.

Tool gives PCs access to Disoss

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Open Communications, Inc. has introduced Diamond, software that it said enables users of IBM's Personal Computer family to access IBM's Distributed Office Support System (Disoss) office automation product.

The software publisher and system integrator claimed Diamond is the first package to allow such access either via LU6.2/Advanced Program-to-Program Communications or through an IBM 3270 data stream.

Diamond reportedly prompts the operator for all information necessary for proper Disoss operation through the use of windowed menus.

It is said to implement the functionality of a Document Interchange Architecture Source/Recipient node in what Open Communications called an easy-to-use package.

Diamond also includes a script-file capability as well as an Application Program Interface to allow user-written programs to direct the transfer of documents without operator intervention. The package is priced at $245.

AT&T

CONTINUED FROM PAGE 43

of AT&T's costs associated with dedicated non-traffic-sensitive investment," AT&T Communications administrator of rates and tariffs W. E. Lind explained in a letter to the secretary of the Federal Communications Commission.

Recent market research by AT&T indicates that approximately 50% of Switched 56 access lines were purchased as backup dial-up or disaster recovery facilities "and are only used to reestablish communications if private-line, point-to-point, digital data lines fail," according to Lind.

As a result, AT&T is currently not collecting enough revenue from actual traffic across those lines to make back its installation costs, the company claimed.

BIT BLAST

Vermont places rate cap on basic telephone services

The Department of Public Service in the state of Vermont has agreed to deregulate **New England Telephone & Telegraph Co.'s** business telecommunications services in exchange for a rate cap on basic telephone services.

As part of the five-year landmark agreement, New England Telephone would freeze basic service rates through 1988 and limit increases on those services for the following three years. In return, Vermont's Public Service Board would stop regulating the company's rate-of-return margins on most business telephone services.

The Corporation for Open Systems (COS) International and the **National Computing Centre** of Manchester, England, are said to be jointly developing testers for product compliance with two Open Systems Interconnect protocols: File Transfer and Access Management and Message Handling Systems. COS reportedly plans to make the testers available under license and to implement them in its conformance-testing service.

Local-area network (LAN) vendor **Bridge Communications, Inc.** said it plans to equip its field-service locations with **Network General Corp.**'s Sniffer Portable Protocol Analyzer. Bridge field-support engineers would use the Dual-LAN Sniffer to isolate trouble spots on customers' networks.

South Central Bell and **South Central Bell Advanced Systems**, units of Bell South Corp., recently made the first joint marketing sale by subsidiaries of a regional Bell holding company. Under the agreement, the two companies will provide the Bank of Mississippi, headquartered in Tupelo, with a variety of telecommunications products and services for a statewide banking network. Bell South is the first Bell holding company to receive Federal Communications Commission approval for limited joint marketing by its regulated and unregulated subsidiaries.

The 3270 Emulation Memory Management Enhancement program, originally developed by **IBM** for The Travelers Corp., is now commercially available.

The two programs are said to allow IBM Personal Computer or Token-Ring network users to move back and forth between multiple host and IBM PC-DOS-based sessions. PCs on the network can also receive information from the mainframe while the emulation program is not in memory and they are working on other applications.

EDS ends bid

CONTINUED FROM PAGE 43

has vowed to award the contract by the end of this year.

The EDS/Sprint partnership was pitted against the team of AT&T and Boeing Computer Services Co. and the team of Martin Marietta Corp. and MCI Communications Corp. The FTS 2000 contract is for a digital, software-defined voice and data network connecting federal agencies nationwide — the world's largest private-line network.

"Of the three contenders, I would say that EDS/Sprint was the weakest. Most people see the competition to be between AT&T and the Martin Marietta team," said Dennis Oldson , vice-president of Telesynetics Corp. in Fairfax, Va. Telesynetics is a communications consulting firm that developed the bid-request documents for FTS 2000.

'Cut your losses and get out'

Noting that the preparation of an FTS 2000 proposal could cost as much as $20 million, Oldson said, "If you think you're a little weak, you've got to either find your strengths or cut your losses and get out."

The analysts agreed that, because of the high stakes involved, there will be formal bid protests and lengthy court battles no matter who wins the contract.

EDS and Sprint officials said a major reason that EDS withdrew from the competition was a complex agreement between the GSA and AT&T last month that weakens the GSA's requirement for a fixed-price contract. The EDS/Sprint team fears that, unless the contract has a fixed price over its 10-year life, AT&T could bid an artificially low price and then maneuver to raise prices later.

AT&T had protested that the GSA's requirement for a fixed-price contract would exclude it from bidding, since AT&T is a regulated carrier whose prices could be raised by the Federal Communications Commission. AT&T spokesman Herb Linnen said the company has no intention of submitting an artificially low bid. He called the competitors' argument "nonsense," because AT&T's FTS 2000 tariff must withstand FCC scrutiny.

EDS stressed that it maintains "a healthy business relationship" with Sprint and praised the long-distance firm's technical capabilities. "If Sprint assumes the prime bidding position on this procurement, EDS will provide the support necessary to optimize Sprint's capability of submitting a competitive bid to GSA," an EDS statement added.

E-mail

CONTINUED FROM PAGE 43

room 340% to 2.7 million by 1991, according to the report.

The increased use of service bureaus for intersite electronic mail is linked to the growth of personal computer and host-based intraoffice messaging systems, the report states. In excess of 12 million PCs are currently installed, and that figure is expected to climb to 22.5 million by 1991.

Because PCs will remain the primary means of E-mail access, the annual revenue growth for the service bureaus is closely associated with PC installations, the report claims. Several electronic messaging service vendors are fostering this connection through front-end packages that facilitate PCs' access to their mail systems.

Connect PCs to mail systems

For example, MCI and Lotus Development Corp. have jointly introduced Lotus Express, a link between PC users and MCI Mail; MCI also offers Desktop Express for Apple Computer, Inc. Macintosh users. Telenet offers PC Telemail; Tymnet McDonnell Douglas Network Systems Co.'s Ontyme offers Tym/Com. A key function of these systems is the ability of PCs to transmit binary files, including software, spreadsheets and other documents with embedded commands.

The ability to interconnect with customers' existing host- and PC LAN-based intraoffice messaging systems represents a crucial growth factor for the public E-mail service bureaus, the report states.

Geisco, MCI and Western Union are among the companies that offer links between their E-mail services and host-based integrated systems such as IBM's Distributed Office Support Systems (Disoss), Digital Equipment Corp.'s All-In-1, Data General Corp.'s CEO and Wang Laboratories, Inc.'s Wang Office. Host-based E-mail systems will grow in number from about 25,000 systems in 1986 to a projected 100,500 by 1991, the report predicts.

Compliance with the CCITT X.400 electronic-messaging standard should promote messaging services' connections to both host-based intraoffice systems and international messaging systems — thus contributing to their market expansion, Link predicts. Service bureaus are just beginning this year to promulgate X.400 strategies.

Links slow in coming

However, the services have been slow to link up to PC LANs, the report states. The bureaus have been put off by the immaturity and diversity of the LAN market, leaving it up to LAN and PC software vendors to offer connections to their services. For example, 3Com Corp. offers links to MCI Mail, Disoss and a Unix-based mail system. Expected future growth of PC LANs and message traffic on the LANs make it desirable for the service bureaus to offer LAN connections, Link says.

The number of installed PC networks, which compete with host-based intraoffice systems as mechanisms for delivering electronic messaging within departments and buildings, will zoom from 108,000 in 1986 to 650,000 by 1991, according to the report.

Increased competition in the E-mail market should result in lower cost per message, according to the report. In 1986, it cost more than $1 to send a message; a cost that is expected to be cut by more than half, to 47 cents, by 1991. User costs will drop because service bureau fixed costs are low — so adding new subscribers is an incremental cost. Also, because the competition from private intraoffice systems and other premise devices offer such options to the user, the service bureau must keep costs down to be competitive, according to Link.

Switch may extend Nynex digital net

BY ELISABETH HORWITT
CW STAFF

WHITE PLAINS, N.Y. — Nynex Enterprises Co., a division of Nynex Corp., is evaluating a central-office switch add-on from Integrated Network Corp. as a way for Nynex's operating companies to provide digital 56K bit/sec. services "virtually anywhere" on their networks, the company said recently.

A field-trial agreement has been reached in which Nynex will test Integrated Network's Integrated Data/Voice and Universal Switched Data Capability system at New England Telephone and Telegraph Co. and New York Telephone Co. central office sites.

The system reportedly allows existing central-office 1AESS switches to support 19.2K and 56K bit/sec. digital-data transmission in addition to analog-voice networking [CW, June 1]. Nynex currently offers the Switchway 56K bit/sec. digital service in a limited number of locations where demand has justified replacing the analog switch with a new digital switch.

"Integrated Network's product will be a quantum leap in terms of the flexibility with which we can implement the Switchway service," Nynex spokesman Kevin McLernon said.

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If reliability is high on your list, count on the 965. Its state-of-the-art single board design uses just 26 logic chips to give you a very, very reliable terminal that's very, very easy to service. There's also a full one-year end-user warranty.

If it's advanced features you look for first, look at the display. The 965 can display up to 49 data lines. That's enough to show large spreadsheets or two normal display pages of text at the same time. No other terminal this affordable can do that. There's also an interactive calculator, extra-user ROM socket, and 16-bit CPU. Not bad for the most affordable high-performance terminal you can buy.

Want even more features? How about a brilliantly designed new case that swivels, tilts and rotates with a touch of your finger. It even moves up and down when you add the optional arm. There's a sleek 14″ high-resolution, high-contrast flat screen in your choice of green or page-white. A 2-position keyboard (ASCII, AT or Enhanced PC) complete with a full accounting pad, 20 user-programmable editing keys, 128 programmable function keys, and much, much more.

All those features in a terminal that takes up very little space on your desk. Slide the keyboard under the optional pedestal base and the 965 takes up even less.

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IBM's access

CONTINUED FROM PAGE 43

on some other system in the network. It works in the following way: an application issues a standard local-file I/O request to access data without regard to where the data is physically located or on what type of system it resides. The local data management system first checks to see if the requested data resides locally. If it does, the I/O operation proceeds normally without DDM involvement. If it doesn't, the local-file system passes the I/O request to the DDM software on that system. The DDM software translates the request to DDM commands and transmits them to the appropriate remote system using the SNA LU6.2 communications facilities of the system.

The remote DDM system services the request and returns the results to the requesting system using DDM protocols. In turn, the requesting application is presented with the results in the same manner as if the request had been satisfied locally. The DDM processing is transparent to the application program in some IBM DDM implementations.

IBM has implemented DDM support for its CICS environment on 370-type mainframes, System/36 and 38 and its Personal Computer. The level of DDM capability differs from one type of system to another, however. IBM mainframes running CICS are limited to acting as DDM Target systems, meaning that they can satisfy requests for access to records that reside on the mainframe. CICS can service DDM requests from other systems but does not support application program requests for records that may be located on systems other than the mainframe.

The PC, on the other hand, has just the opposite role — that of a DDM source system. This means that application programs on the PC can request access to data that resides on other mainframe, System/36 or 38 systems. The DDM/PC program does not support DDM Target capabilities and therefore cannot service requests for data that originate on other systems.

DDM functionality hierarchy

The System/36 and 38 departmental processors support both Source and Target DDM capabilities. DDM requests can originate from these systems and requests for data access from other systems can be serviced by these systems. This difference in DDM functionality between the major IBM system types forms a true hierarchy, with mainframes at the top (in the role of file servers to the network), PCs at the bottom (in the role of workstation requesters of service from the network) and departmental systems in the middle (to both request and provide services to the network).

In the mainframe and departmental processor systems, DDM has been integrated with the data management systems and/or operating systems to provide true transparency to application programs as described above. Unfortunately, DDM/PC does not provide this type of I/O transparency to application programs, primarily because IBM's PC-DOS does not support the record-oriented level of file access currently defined by DDM. PC-DOS deals only with byte streams, so an application program that issues a PC-DOS file I/O request can only access a local PC-DOS file.

To make use of DDM on the PC, applications must be written that specifically use the Application Program Interface (API) provided by DDM/PC. Via this API, access to record-oriented files that exist on other target DDM systems is provided. Access to local files must be made with separate standard PC-DOS calls.

This limitation can be expected to change with IBM's data management support under the OS/2 operating system. Until IBM integrates the DDM support with the operating system users will have to write new applications to take advantage of DDM on the PC.

DDM may become the standard way of sharing and accessing data of all types, including relational data bases. In such a scenario, SQL would be the high-level interface seen by users and application programs, while DDM commands and protocols — preferable to SNA LU6.2 sessions — would be used for transporting the requests between the distributed data management systems.

In a similar manner, DDM can also be used in conjunction with other IBM technologies. IBM may use DDM commands and protocols to standardize user access for its Enhanced Connectivity Facilities (ECF), which currently provides IBM PCs with virtual-disk and virtual-file functionality on an IBM mainframe host via an LU2 (3270) connection. Expect ECF to be used on top of DDM and LU6.2 peer-to-peer protocols. It also is likely to be included under SAA, in which case IBM would extend its functionality to System/36 and 38 departmental processors and to the Personal System/2. The PS/2 would initially be restricted to requester function but may end up having server side implemented on it as well.

DDM can be expected to play a major role in IBM's strategy of more closely integrating its incompatible mainframe, departmental processor and PC systems. By defining a generic, system-independent means of accessing data it can be implemented on dissimilar systems, allowing them to share data distributed in a network.

Randesi is chairman of the board at Gen2 Ventures, a firm that provides information products and services on IBM multitechnology networking.

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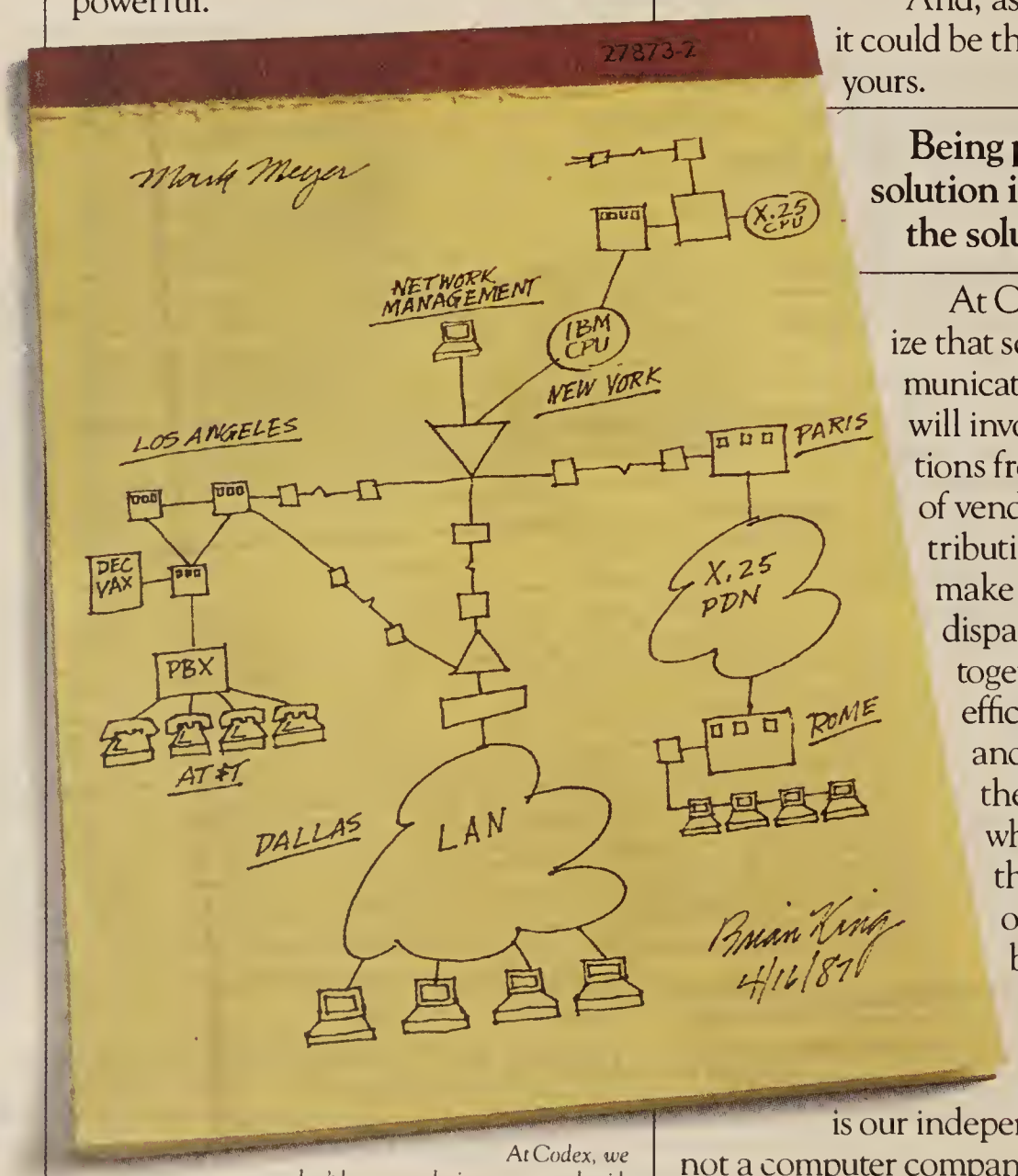

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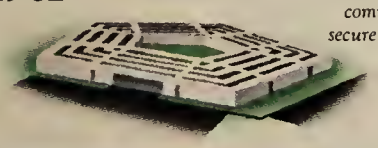

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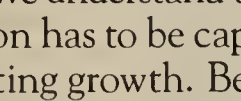

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Codex hasn't just developed a lot of networking solutions. We've practically developed the whole business of networking.

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When you call Customer Service, you've got the whole company on the line.

To help us further accommodate your company's future growth, Codex is very active in industry standards committees, helping to create the kind of "open architecture" that will allow you to link equipment from many vendors in a more productive way. With that kind of support, your network will be able to grow by leaps and bounds. And your business along with it.

For years, we've worked with some of the best-known companies in business. Isn't it time we worked with you?

Codex is currently working with 97% of the Fortune 100. These companies, like yours, have to rely on their network for success. And, since they're considered to be among the most successful companies in the world, it would appear that our network solutions are working. And that the experience we've gained from those associations and others can be put to work just as successfully for your company.

In fact, in a recent *Data Communications* survey, many of these and other companies consistently ranked Codex first as the networking vendor they preferred in categories ranging from best price/performance to technology to customer support.

And of course, beside working for successful companies, we're also backed by a successful company – Motorola.

How can you find out what Codex can do for *your* applications?

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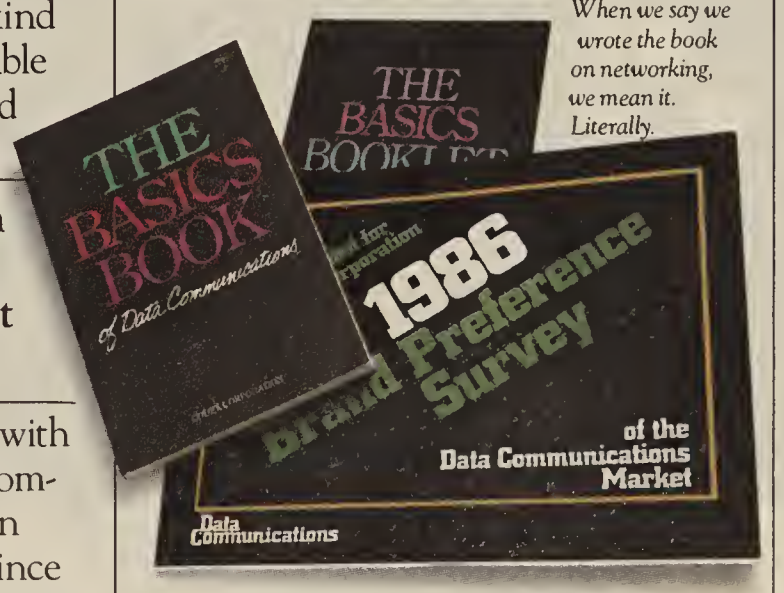
We'll be happy to send you a free copy of *The Basics Book of Data Communications* – an informative guide to the ins and outs of networking based on our extensive experience.

When we say we wrote the book on networking, we mean it. Literally.



Of course, the book should be informative. After all, it took 25 years to write.

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NEW PRODUCTS

Network management

The **MC68KTBFA**, a real-time software tool said to speed development of token-bus networks, has been announced by **Motorola, Inc.'s Microprocessor Products Group.**

The Token-Bus Frame Analyzer (TBFA) keeps track of statistics while monitoring network performance and shows specific user-chosen frames via a triggering mechanism.

The MC68KTBFA is priced at $2,500.

Motorola, 6501 William Cannon Drive W., Austin, Texas 78735.

Customer-premise equipment

Command Center Plus, a multipurpose switching system said to offer push-button control of up to five devices, has been introduced by **Curtis Manufacturing Co.**

Command Center Plus is said to protect communications equipment against damage due to electrical and phone-line surges and electromagnetic and radio frequency interference.

Command Center Plus costs $139.95.

Curtis Manufacturing, 305 Union St., Peterborough, N.H. 03458.

Links

A set of solutions said to integrate Digital Equipment Corp.'s VAXBI-based computers into the Xyplex System has been introduced by **Xyplex, Inc.**

The **Xyplex Host Interface Software** allows users to connect a DEC VAX 8000 series, a VAX 700 series or a Microvax II series processor to the Xyplex Distributed Network Processing System through any DEC Ethernet controller.

The **BI Communications Front-End Processor** (FEP) is said to allow connectivity to Ethernet, linear-coaxial cable or broadband cable television.

The Host Interface Software is available to Xyplex software licensees at no additional charge. The BI Communications FEP costs from $7,500.

Xyplex, 100 Domino Drive, Concord, Mass. 01742.

Electronic mail

Software said to enable IBM System/36 and 38 users to participate in Electronic Data Interchange (EDI), the electronic exchange of documents over third-party public and private networks, has been introduced by **ACS Network Systems.**

EDI/36 and **EDI/38** require a communications port, a telephone line and a modem, the vendor said. EDI/36 and EDI/38 cost $5,000 and $8,000, respectively.

ACS, 1485 Enea Court, Concord, Calif. 94520.

Security

A government-endorsed, Data Encryption Standard-based digital encryptor that operates in full-duplex mode for synchronous communications at rates from 1,200 bit/sec. through 112K bit/sec. has been introduced by **Cylink Corp.**

The **Cidec-MS** was designed for protecting data communications transmitted over voice-grade point-to-point modem circuits or via any Dataphone Digital Services.

The Cidec-MS costs $2,500.

Cylink, 920 W. Fremont Ave., Sunnyvale, Calif. 94087.

Modems/ Multiplexers

Novation, Inc. has introduced the **2400 XE/HC** half-card modem.

The 2,400 bit/sec. modem is compatible with the Hayes Microcomputer, Inc. AT command set. It provides synchronous and asynchronous operation in full- and half-duplex modes and includes audio-call monitoring.

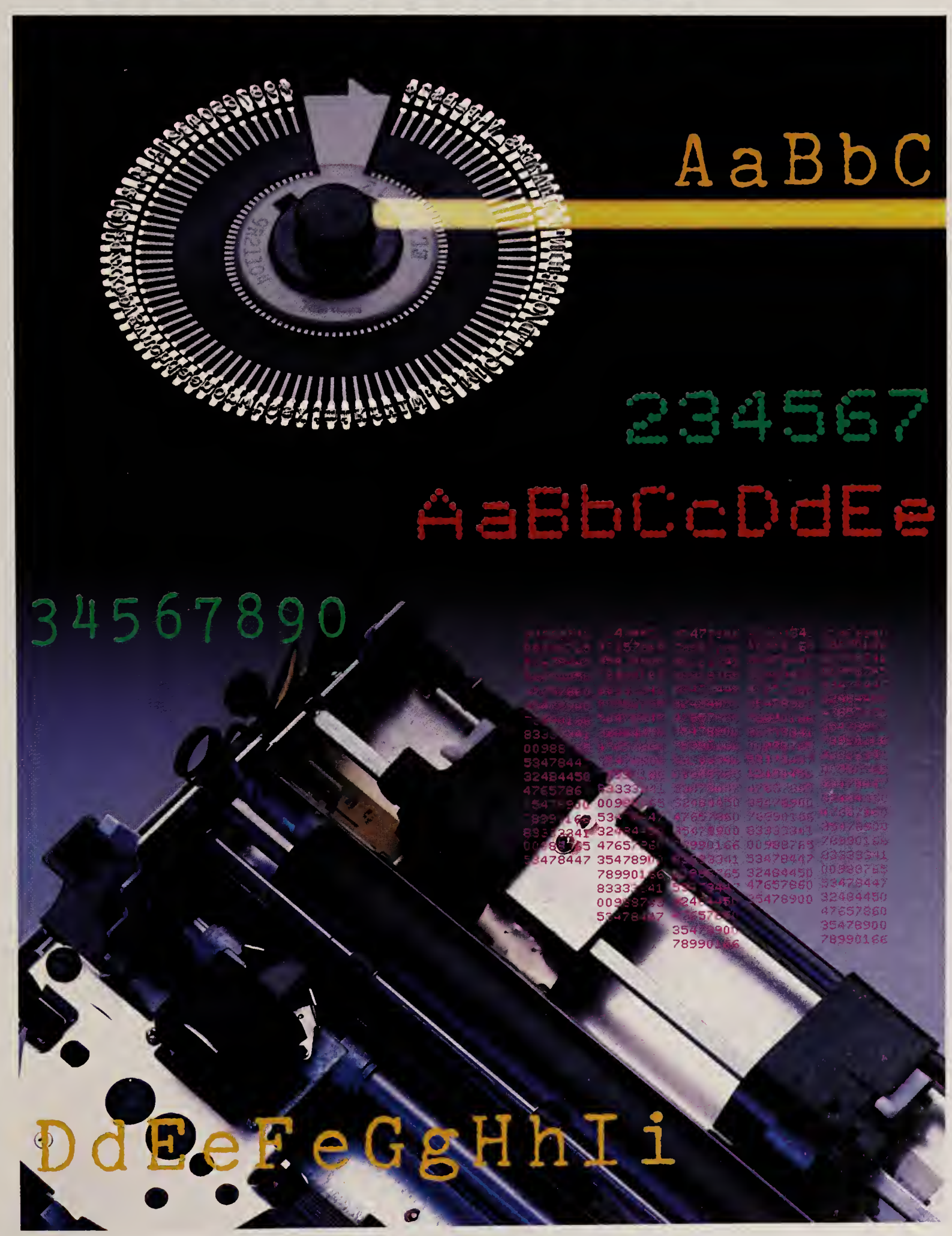
The modem, including Microsoft Corp. MS-DOS-compatible Procom software, costs $299.

Novation, 21345 Lassen St., Chatsworth, Calif. 91311.

COMPUTERWORLD

SPOTLIGHT

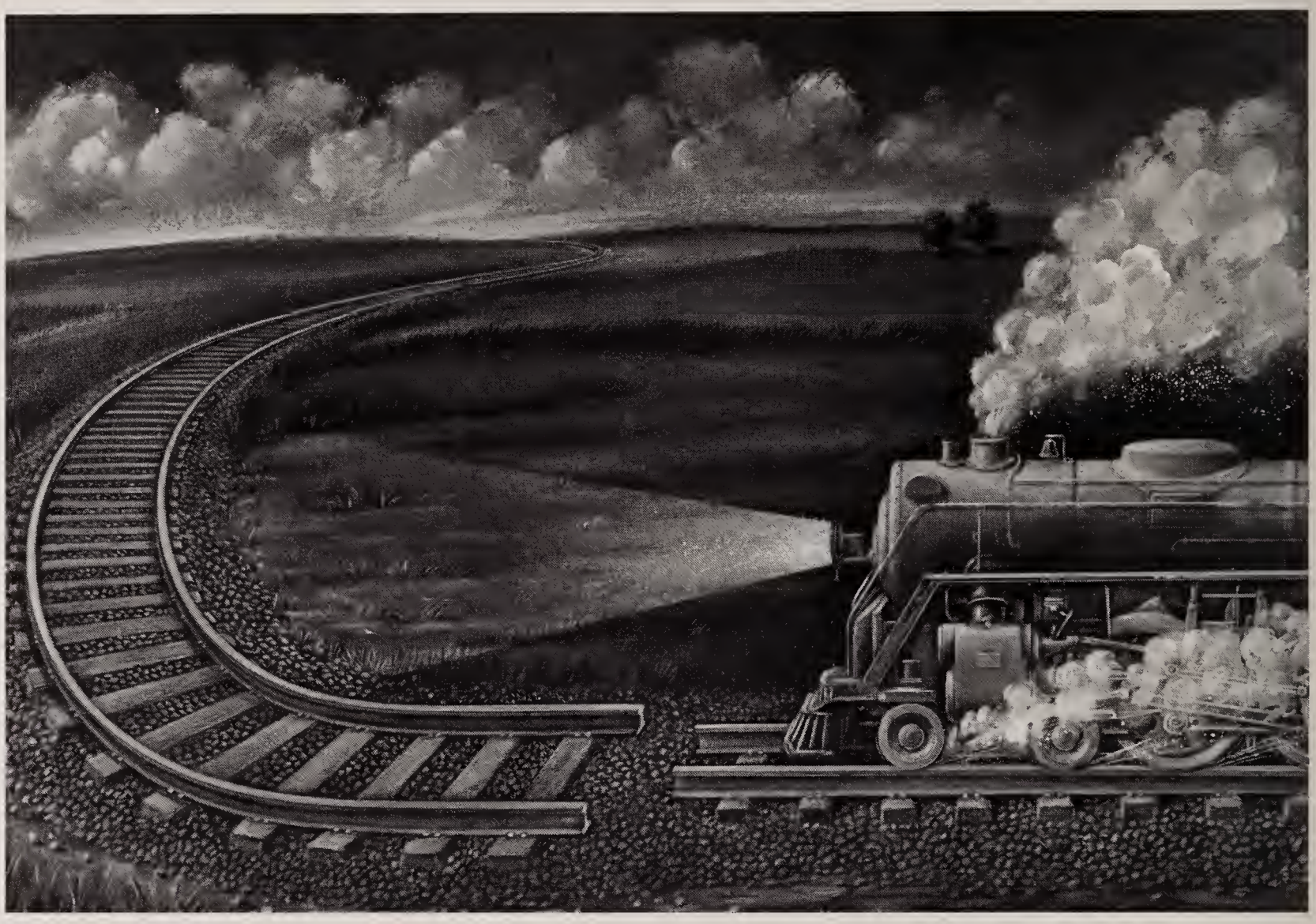
IMPACT PRINTERS



Though less glamorous than their nonimpact cousins, impact printers are proving a hardy breed, capable of evolving to meet the ever-changing applications needs of users.

Issues of the Information Age:

The way beyond Babel.



Imagine trying to build a railroad system if every locomotive manufacturer used a different track gauge. And each local stretch of railroad had a different load-carrying capacity and its own unique set of signals.

The business of moving and managing information is in a similar state today. Machines can't always talk to each other. Proprietary systems and networks abound. And the enormous potential of the Information Age is being dissipated by incompatibility.

The way beyond Babel lies in setting firm, far-reaching standards. In developing products and services that conform to those standards while establishing new standards for higher-level functions and applications.

The process must be continuous. Dynamic. And cooperative. We must share our visions, technical approaches and experiences. AT&T is committed to that course.

Our involvement in the evolution of ISDN (Integrated Services Digital Network) is a good example of this process at work.

AT&T works closely with national and international coordinating groups to establish standards through consensus and insure that they are consistently interpreted.

Where standards are firmly established, we've developed products and services that conform to them and address a broad range of customer needs. From voice/data work stations and ISDN PBXs for business to central office switches for Operating Telephone Companies.

Wherever possible, we've also shared the benefits of our experience, as we did in a recent Chicago test where, in partnership with Ameritech's Illinois Bell, AT&T began the nation's first customer application of a production ISDN system for McDonald's.

We must, as an industry, continue working together to provide our customers with maximum flexibility and utility. Then they can decide how and with whom to work.

Once we've taken those important steps, we foresee a time when the promise of the Information Age will be realized. A time when people will participate in a worldwide Telecommunity through a vast, global network of networks. A merging of communications and computers which will enable them to handle information in any form—conversation, data, images, text—as easily as they make a phone call today.

Telecommunity is our goal. Technology is our means.℠

We're committed to leading the way.

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Despite the fanfare surrounding emerging nonimpact technologies, daisywheel and dot matrix printers are still thriving.

THE GROWING PRINT IMPACT

BY THOMAS G. BONGIORNO

BLAIR THORNLEY

Revolutions grab headlines. Evolutions, while their impact may be significant, usually follow a steady course without attracting much attention. This distinction has certainly been apparent in the printer industry recently, in which revolutionary developments in nonimpact technology have overshadowed the appearance of a new breed of impact printers, more flexible and more capable than the species has ever before produced.

Impact printers are now able to do things that most end users would not have dreamed of just a few years ago when, as everyone knew, the universe was divided into daisywheel and dot matrix, two highly specialized and mutually exclusive technologies. Daisywheel printers were designed for correspondence, dot matrix printers for producing drafts or statistical reports. The drawbacks of one type were a mirror image of the advantages of the other: Daisywheel printers were slower and more expensive but produced significantly better print quality, while dot matrix printers were faster and less expensive but produced output that many users felt belonged only on green-bar paper.

The fiercely competitive nature of the industry prevented that situation from lasting for very long. As production volumes skyrocketed, prices of printers dropped dramatically — but more important, printers became more advanced, offering end users more features and enhanced print quality.

The reaction of most printer users to the thought of using a dot matrix printer for printing high-quality correspondence parallels the initial reaction of the general public when unleaded gasoline was first introduced — "No thanks, not for me. . . . I need the pep of regular or the real power of high-test."

Where are we today? Most gasoline is lead-free, some stations sell only lead-free, and super-no-lead is commonly available for power drivers. Similarly, impact printers, especially impact dot matrix printers, have proved themselves capable of meeting the ever-changing needs and applications of printer users.

In spite of all the attention given to the nonimpact printer arena, impact printers are not only alive and well, but the outlook for their future is basically healthy. The qualifier "basically" is used because the market is changing, and the product mix will need to change, both to stay ahead of the competition and to stay in tune with the application-oriented needs of the end user.

There is no question that impact printers will have to surrender their market share to nonimpact printing technologies, but, if the days of exclusive rule are indeed over, the remaining domain is, and will continue to be, significant. According to Datek Information Services, a market research firm based in Waltham, Mass., impact printers accounted for nearly 84% of the printers sold in the U.S. in 1986. Looking ahead to 1990, Datek projects they will still constitute 68% of unit sales.

From a revenue standpoint, the numbers are not quite so impressive, because prices for impact printers are generally lower than those for

Bongiorno is an independent marketing consultant based in New York. For the past six years, he has worked in the impact printer industry.

Thriving

FROM PREVIOUS PAGE

nonimpact — and they continue to drop. Impact printers accounted for 68% of the revenue generated by the sale of printers in 1986, and that number is expected to drop to 49% in 1990.

Impact printers are often grouped into four industry-standard categories — serial-impact dot matrix, serial-impact fully formed, line-impact dot matrix and line-impact fully formed.

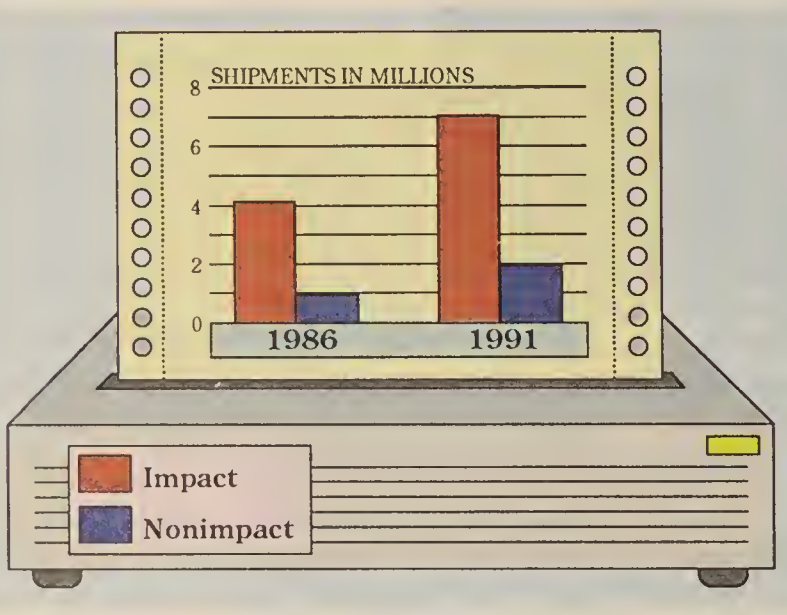
The serial-impact dot matrix category represents approximately 8% of the impact printers shipped during 1986 and 68% of the revenue generated, according to Datek.

The current array of dot matrix impact printers includes several adaptations of the basic dot matrix technology, none of which have the slightest bearing on the type of interface used. Serial matrix printers may use either a serial or a parallel interface.

What distinguishes these subcategories is the number of pins, also called wires or needles, in the print head that strike the ribbon and paper.

Impact vs. nonimpact printers

U.S. unit shipments - 1986 (actual) and 1991 (projected)



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The first dot matrix printers from Japan used a print head with seven pins. These printers were criticized for not being able to satisfactorily print true descenders, which are the tails of certain letters (g and p, for example) that should fall below the normal print line.

Currently, printers using 9-pin print heads, which allow satisfactory printing of descenders as well as underlining, are the most popular dot matrix type. Datek estimates these printers accounted for 88% of the unit shipments of impact matrix printers during 1986.

With one pass of the print head, these printers produce draft-quality printing; two passes are required to print in the enhanced-quality mode called near-letter quality. The first of what are often called high-density print heads were the 18-pin print heads, which utilize two vertical rows of pins with nine pins in each row.

These print heads can handle near-letter-quality mode with only one pass of the print head but are otherwise quite similar to 9-pin printers. The size of the actual dot and the resulting print quality are identical. These printers accounted for less than 3% of the dot matrix impact printers shipped during 1986.

The dot matrix printer that has received the most attention, of late, is the 24-pin printer. Typically, the pins in this head are arranged in two vertical rows of 12 pins. The rows are usually offset horizontally by half a dot in order to produce the required straight lines; this process masks the curves of the individual dots. Some manufacturers are experimenting with alternate pin configurations (such as the diamond-shape print head on the Prowriter C-815 Supra from C. Itoh Digital Products, Inc.).

Among the benefits claimed by 24-pin printer vendors are quieter operation and higher printing speeds, but these models accounted for little more than 8% of the dot matrix impact printers shipped during 1986, according to Datek.

One manufacturer, Alps America, a division of Alps Electric U.S.A. Corp., offers a snap-in, interchangeable 24- or 18-pin print head on three of its models. The company's reasoning in adopting this design, according to Dan Steele, the senior product marketing manager for Alps, was that it gives users the flexibility to move into 24-pin technology without sacrificing the benefits that 18-pin print heads offer, including their cost advantages, longer life span and compatibility with software drivers written for 9-pin models.

Other dot matrix printers contain varying numbers of pins, but, currently, these account for a relatively small portion of overall sales. New, unreleased print head designs include a 27-pin printer rumored to be near introduction by a major personal computer manufacturer and a 32- or 36-pin printer that is reportedly aiming to replace the current market demand for 24-pin printers.

There is some question, however, about how much advantage can really be gained simply by adding more wires. Dennis Cox, group product manager of peripherals at Epson America, Inc., is skeptical. "I don't feel there's much value in doing that," he says. "We have optimized the output/speed capabilities with 24 pins — additional pins is not the wave of the future."

Flowers and thimbles

Serial-impact fully formed is a formal designation for what is more commonly known as a daisywheel printer. Most of these printers use a daisy-shaped wheel on which the spokes, or petals, contain the raised character that makes the mark on the paper.

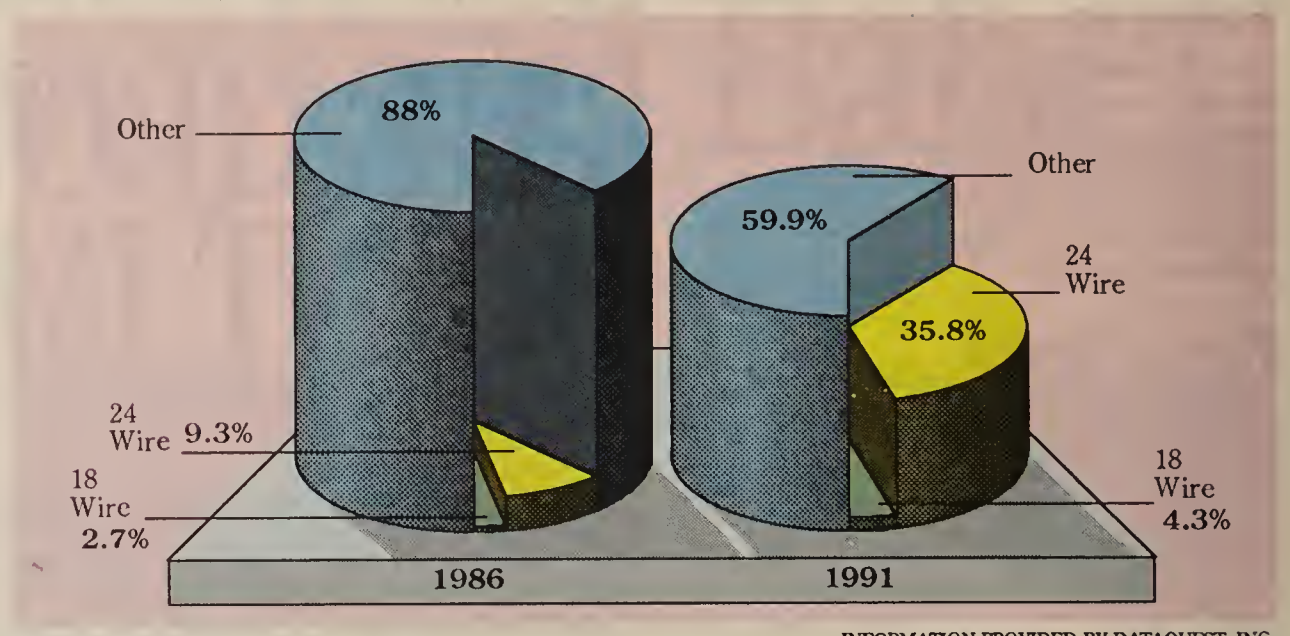
One manufacturer produced a printer in the daisywheel category that does not resemble a flower at all. Instead, it uses a thimble shape, which is quite similar to the familiar ball used on the IBM Selectric typewriter. For simplicity's sake, however, the term "daisywheel printer" is used to refer to both types.

The daisywheel printer, while classified as an impact printer, differs from dot matrix in that a fully formed, raised key strikes the ribbon, leaving the imprint of a fully formed character. This category represents about 10% of both units shipped and revenue generated during 1986.

The remaining categories — line-impact dot matrix and line-impact fully formed — represent only a tiny portion of the unit shipments for 1986 but 21% of the revenue generated, which says something about their prices.

Dot matrix shipments by print head type

U.S. shares-1986,1991



INFORMATION PROVIDED BY DATAQUEST, INC.
CW CHART: MITCHELL J. HAYES

Line printers, which print an entire line of text at a time, compared with serial printers, which print one character at a time, are at the high-speed end of the market and are used for general data processing output in mini or supermini computer systems.

Line dot matrix printers have become more popular than line-impact fully formed, due to their dependability, applications versatility and graphics flexibility. Both product groupings, however, are specialized products and not generally considered to belong in the printer mainstream.

> "We have optimized the output/speed capabilities with 24 pins — additional pins is not the wave of the future."
>
> DENNIS COX
> EPSON AMERICA, INC.

The high-density print heads of 18 and 24 pins are quickly encroaching on the territory once securely held by 9-pin dot matrix printers. Dataquest, Inc. projections show that by the year 1991 these 18- and 24-pin printers will account for 40% of the unit sales and revenues of all serial-impact dot matrix impact printers, with 24-pin clearly the more ascendant of the two technologies (see chart above).

The pins used in 24-pin print heads are of a smaller diameter than the 9- or 18-pin versions, producing a smaller, finer dot on the paper. These printers were originally designed by the Japanese for domestic use to print the fine lines and elaborate brush strokes of their Kanji characters. Critics of the technology claim that the dots are too fine for the preferences of the American consumer.

In a recent Datek study, the print quality of an 18-pin printer was rated as more appropriate for end-user applications than was a print sample from a 24-pin printer. The most prevalent reason cited was that the 18-pin print sample was "dark/bold," whereas the 24-pin print sample was typically seen as being "too light." In terms of graphics reproduction, the 18-pin print sample was seen as being "too dotty," whereas the 24-pin print sample was seen as "clean and crisp" but still too light.

Other criticisms of 24-pin technology include the incompatibility of the pin layout with many software packages on the market. This claim continues to lose strength as more software manufacturers develop drivers that permit these printers to operate satisfactorily. The recent announcement of IBM's Proprinter X24 and Proprinter XL24 have basically assured the market that software incompatibility will not be an issue for much longer.

Since the above study, the use of film ribbons, as compared with the standard fabric ribbon, has become increasingly popular. Film ribbons enable the end user to achieve greater contrast between text and paper, reducing the amount of gray printing that has plagued printer users for years and overriding a major objection to 24-pin printers.

First introduced and marketed by NEC Information Systems, Inc. on its P9XL and P5XL printers, both 24-pin models, the use of film ribbons is catching on. Another major manufacturer of 24-pin printers, Toshiba America, Inc., has recently announced it will also make this type of multistrike film ribbon available on its newest 24-pin printers, Models P321SL and P341SL. Other printer manufacturers have indicated they will soon offer the same type of ribbon as an option.

The daisywheel printer market has been on the decline for a couple of years now, due to the

Continued on page S4

Impact printers: Still the solution of choice

BY CORINNE KODY

Despite all the fanfare surrounding desktop publishing and laser printers, impact printers remain the solution of choice for many end-user applications and vertical markets. In 1986, daisywheel, serial dot matrix, line character and line matrix printers accounted for more than 86% of all printers shipped, according to International Data Corp. (IDC), a market research firm based in Framingham, Mass.

Daisywheel printers. Although daisywheel printer shipments are declining due to market erosion by 24-pin dot matrix printers and laser printers, applications still exist for these high-resolution printers.

Daisywheel printers are useful for businesses that desire letter-quality print and for offices that have low-volume printing requirements that do not need particularly high speeds. Daisywheels are also sought by those with a need to print multipart forms. While 24-pin printers are capable of handling multipart forms because of the fineness of their print wires, the resulting multiple copies are not always as clear as those produced by full-character printers.

Daisywheel printers are a viable output option for the legal, consulting, financial and government sectors.

Serial dot matrix printers. In 1986, more than 3.6 million serial dot matrix printers were shipped in the U.S., and more than 90% are primarily used 50% or more of the time for generating reports, letters, memos, spreadsheets and so forth.

Serial dot matrix printers meet user requirements for print quality, reliability, purchase price, speed and software support. In general, they offer greater paper-handling flexibility than nonimpact printers in accommodating envelopes, continuous forms, labels and a multitude of paper sizes.

There is an enormous amount of software available for serial dot matrix printers, especially for the 9-pin dot matrix models.

As users increasingly demand the ability to integrate both text and graphics, impact dot matrix printers are beginning to find a place in the world of business graphics. There are a number of advantages to using dot matrix printers for graphics applications.

Due to their high speed, serial impact dot matrix printers are suitable for draft graphics output. These printers also support color and multiple fonts and, with prices ranging from $300 to $1,500, fit a variety of budgets.

Line printers. At the high end of the impact printer spectrum, impact technologies have dominated the corporate MIS shop. Line character printers have traditionally been known as the workhorse of the MIS environment. Despite recent competition from nonimpact printers, the line character printer's combination of high reliability, sharp print quality and high speed will ensure their retention in MIS departments.

Line dot matrix printers have shown signs of improved reliability and print quality, thus warranting consideration as an alternative to the traditional line character printer.

Once again, as at the desktop and departmental level, the need for integrating graphics and text is also growing within the data processing department, and a logical solution is the line matrix printer. It is a cost-effective approach supplying both the print flexibility of the serial dot matrix printer and the speed of the line character printer.

Bar code printing

Another application in which impact technologies are playing a major role is demand bar code printing. Demand bar code printing will experience an accelerated growth in the next few years, with an average unit growth rate of 29% between 1986 and 1991, according to IDC.

Impact matrix printers are the clear favorite for demand bar code label printing, because they offer a wide number of advantages for this highly flexible application. Impact matrix printers use inexpensive label stock, can produce sequentially numbered bar codes and can generate both labels and forms. Impact matrix printers can also print any number of different bar codes, support most symbologies and print on any location on a label.

Undeniably, nonimpact technologies will grow in the next few years; however impact technologies will not disappear. As indicated by IDC estimates of a 10% average annual growth rate for impact printer shipments between 1986 and 1991, there will still be applications and vertical market niches requiring the many attributes of impact printers. •

Kody is manager of the Printer Market Program at International Data Corp., a market research firm in Framingham, Mass.

Daisywheel printers

COMPANY	PRODUCT	TWO-COLOR CAPABILITY	RATED PRINT SPEED (CHAR./SEC.)	MAXIMUM PAPER WIDTH	NUMBER OF COPIES	SUPERSCRIPT AND SUBSCRIPT	UNDERLINING	TOP AND BOTTOM MARGINS	WHEEL COMPATIBILITY	DOUBLE-STRIKE OR BOLD-FACE MODE	RATED NOISE LEVEL	SERIAL OR PARALLEL INTERFACE	OTHER PRINTERS EMULATED	STANDARD INTERNAL BUFFER CAPACITY	MEAN TIME BETWEEN FAILURES	PRINT WHEEL LIFE	FILM RIBBON AVAILABLE	SHEET FEEDER OPTION	PRICE
Anzac Computer Equipment Corp. (415) 475-4600	Anzac 3090	No	90	132 col.	5	Yes	Yes	Yes	Primage	Yes	62db	IBM Twinaxial	—	—	—	—	—	—	Contact vendor
AT&T (800) 247-1212	Model 455 Printer	No	55	15 in.	5	No	Yes	Yes	Approx. 30 vendor wheels	Yes	55db	Both	Diablo 630, IBM Wheelprinter	500 bytes	5,300 hours	10 million char.	Yes	Yes	$1,870
Brother International Corp. (201) 981-0300	Twinriter 6 Dual Printhead	No	36	—	—	Yes	Yes	Yes	—	Yes	—	Both	—	—	—	—	Yes	Yes	$1,395
	HR-60	No	60	132 col.	—	Yes	Yes	Yes	—	Yes	—	Both	Brother HR, Diablo	—	—	—	Yes	Yes	$999
	HR-40	Yes	35	16.5 in.	4	Yes	Yes	Yes	—	Yes	—	Both	—	8K bytes	4,000 hours	—	Yes	Yes	$799
	HR-20	Yes	22	14.5 in.	4	Yes	Yes	Yes	—	Yes	57db	Both	—	8K bytes	—	—	Yes	—	$499
C. Itoh Digital Products, Inc. (213) 327-2110	Starwriter F10-55	No	58	15 in.	2	Yes	Yes	Yes	Qume	Yes	65db	Both	Starwriter F10, Qume	256 bytes	—	—	No	Yes	$1,749
	Starwriter D10-40	No	40	16 in.	2	Yes	Yes	Yes	Diablo, Qume	Yes	60db	Both	Diablo 630	8K bytes	—	—	No	Yes	$1,049
C. Itoh Electronics, Inc. (213) 327-9100	F-10	No	40, 55	13.6 in.	3	Yes	Yes	Yes	Diablo	Yes	60db	Both	Qume Sprint 5	2K bytes	NA	NA	Yes	Yes	$1,249-$1,749
	D-10	No	40	—	3	Yes	Yes	Yes	Diablo	Yes	60db	Both	Diablo 630	2K bytes	NA	NA	Yes	Yes	$1,049
Citizen America Corp. (800) 556-1234	Premier 35	No	30	17 in.	6	Yes	Yes	Yes	Diablo 630 and compatibles	Yes	55db	Both	NEC 3550, Diablo 630, Qume Sprint 11	8K bytes	5,000 hours	—	Yes	Yes	From $699
Complete Electronics and Peripherals, Inc. (714) 458-0130	Royal Office Master 2000	No	20	14 + in.	200 +	Yes	Yes	Yes	—	Yes	Less than 57db	Parallel	Diablo 630	1.5K bytes	—	—	Yes	Yes	$299
CPT Corp. (612) 937-8000	Rotary XI	No	41	16 in.	4	Yes	Yes	Yes	Qume, Diablo	Yes	55db	Both	Diablo 630	1K byte	—	—	Yes	Yes	$1,800
	Rotary X	No	40	16.5 in.	3	Yes	Yes	Yes	Qume	Yes	57db	Both	Diablo 630	7K bytes	—	—	Yes	Yes	$1,100
Data General Corp. (617) 366-8911	6321	No	40	13.2 in.	5	Yes	Yes	Yes	None	Yes	55 to 60db	Both	None	2K bytes	5,000 hours		Yes	Yes	From $2,695
	4467	No	20	8.5 in.	3	Yes	Yes	Yes	None	Yes	55 to 60db	Both	None	2K bytes	5,000 hours		Yes	Yes	From $650
Facit, Inc. (603) 424-8000	D2000	No	30	15 in.	3	Yes	Yes	Yes	Proprietary	Yes	56db	Both	Diablo 630	2K bytes	2,500 hours	25 million char.	Yes	Yes	$745
Fujitsu America, Inc. (408) 946-8777	SP320 Q	No	41	16 in.	5	Yes	Yes	Yes	Diablo, Qume, Fujitsu 127	Yes	55db	Both	Diablo 630 API	1K byte	4,000 hours	10 million char.	Yes	Yes	$1,295
Genicom Corp. (703) 949-1000	760	—	48	15 in.	5	Yes	Yes	Yes	—	Yes	Less than 59db	Parallel	IBM PC, Diablo 630	7.5K bytes	5,000 hours	—	Yes	Yes	Contact vendor
	790	—	67	15 in.	5	Yes	Yes	Yes	—	Yes	Less than 62db	Parallel	IBM PC, Diablo 630	7.5K bytes	5,000 hours	—	Yes	Yes	Contact vendor
Hewlett-Packard Co. Contact local HP sales office	2603A	No	45	16.7 in.	5	Yes	Yes	Yes	None	Yes	59.9db	Serial	Diablo 630	2K bytes	4,000 hours	15 million char.	No	Yes	$1,495
IBM Contact local authorized IBM dealer	IBM 5223 Wheelprinter E Model 1	No	16	15 in.	3	Yes	Yes	Yes	—	Yes	60.9db	Parallel	None	1.5K bytes	—	15 million char.	Yes	Yes	$699
Interface Data, Inc. (617) 938-6333	ID 11	No	90	14.5 in.	5	Yes	Yes	Yes	Qume	Yes	65db	Both	Diablo 630, HP 3000, Epson, IBM	2K bytes	5,500 hours	—	Yes	Yes	$1,795
Interface Systems, Inc. (800) 544-4072	ISI 736	No	55	16 in.	5	Yes	Yes	Yes	Thimble	Yes	65db	Coaxial	IBM 3287	4K bytes	—	30 million char.	Yes	Yes	$4,450
MDS Quantel, Inc. (415) 887-7777	Model 4250	Yes	38	16 in.	5	Yes	Yes	Yes	Diablo	Yes	60db	Both	Centronics, Diablo 630	1K byte	4,000 hours	—	Yes	Yes	Contact vendor
Panasonic Industrial Co. (201) 348-7000	KX-P 3131	No	17	13.5 in.	4	No	Yes	Yes	Diablo 630	Yes	63db	Parallel	Diablo 630	6K bytes	3,000 hours	15 million char.	No	Yes	$419
	KX-P 3151	No	22	15.5 in.	4	No	Yes	Yes	Diablo 630	Yes	63db	Parallel	Diablo 630	7K bytes	3,000 hours	15 million char.	No	Yes	$659
Plessey Peripheral Systems, Inc. (800) 992-8744	LQ11	Yes	33	15.5 in.	4	—	Yes	Yes	NEC	Yes	—	Serial RS-232C	—	256 bytes	—	—	Yes	Yes	Contact vendor
Primages, Inc. (800) 821-0066	Primage 90GT	No	90	16.5 in.	5	Yes	Yes	Yes	Proprietary	Yes	57db	Both	Epson Graphics, Diablo 630	2K bytes	6,000 hours	30 million char.	Yes	Yes	$1,095-$1,295
Prime Computer, Inc. (617) 655-8000	3185	No	55		6	Yes	Yes	Yes	Qume	Yes	63db	Serial	Qume	2K bytes	3,000 hours		Yes	Yes	$2,100
Qume Corp. (408) 432-4000	Sprint 11-55	No	55	15 in.	6	Yes	Yes	Yes	60 different wheels	Yes	Less than 63db	Both	NA	14K bytes	4,000 hours		Yes	Yes	$1,495
Ricoh Corp. (800) 742-6487	RP3400Q	No	52	16.5 in.	4	Yes	Yes	Yes	Diablo	Yes	57db	Both	Diablo 630	7K bytes	4,000 hours	—	Yes	Yes	$995
Sanyo Business Systems Corp. (201) 440-9300	PK 5500	No	16	17 in.	4	Yes	Yes	Yes	96 char., double-molded	Yes	65db or less	Parallel	Diablo	0	—	—	Yes	No	$399
Shinwa of America, Inc. (312) 470-1600	Alpha Pro 101	No	20	13 in.	3	Yes	Yes	Yes	Qume, Diablo	Yes	60db	Both	Centronics Parallel, IBM, Apple 2C, Commodore, Atari, RS-232 Parallel	93 bytes	—	—	Yes	No	$103 per 100 units
Silver-Reed America, Inc. (213) 516-7008	EXP 600	No	25	17 in.	3	Yes	Yes	Yes	Proprietary	Yes	65db	Parallel	Diablo 630	3K bytes	3,000 hours	17 million char.	Yes	Yes	$249-$389
	EXP 800	No	40	17 in.	3	Yes	Yes	Yes	Proprietary	Yes	65db	Parallel	Diablo 630	3K bytes	3,000 hours	17 million char.	Yes	Yes	$249-$389
	EXP 420	No	10	13 in.	2	Yes	Yes	Yes	Proprietary	Yes	Less than 65db	Parallel	Diablo 630	2K bytes	3,000 hours	17 million char.	Yes	Yes	$299
Tandy Corp./ Radio Shack (817) 390-3011	DWP 230	No	20	16 in.	3	—	Yes	Yes	IBM	—	—	Both	IBM	—	—	—	Yes	Yes	$399.95
	DWP 520	No	43	16 in.	5	Yes	Yes	Yes	IBM	Yes	—	Parallel	IBM	—	—	—	Yes	Yes	$995
Telex Corp. (918) 627-1111	186 Daisy Wheel Printer	No	40	15 in.	2	No	Yes	Yes	Diablo 96 char.	Yes	65db	Serial	—	256 bytes	—	—	Yes	Yes	$1,750
	286F Daisy Wheel Printer	No	60 to 80	15 in.	5	No	Yes	Yes	Fujitsu, Diablo	Yes	63db	IBM 3270 A Coaxia	IBM 3287	2K bytes	—	10 million char.	Yes	Yes	$5,750
Unisys Corp. (313) 972-7000	AP1305/TO431	No	52	15 in.	5	Yes	Yes	Yes	Qume, Diablo	Yes	60db	Serial	—	—	—	—	Yes	Yes	$1,835
Wang Laboratories, Inc. (800) 225-4637	DW/05-60	No	46	15 in.	5	Yes	Yes	Yes	—	Yes	58db	Wang	NA	64K bytes	4,000 hours	8 million char.	Yes	Yes	$2,600
	PM 018	No	46	15 in.	5	Yes	Yes	Yes	NA	Yes	58db	Both	NA	3K bytes	4,000 hours	8 million char.	Yes	Yes	$1,400
	PM 015	No	28	15 in.	3	Yes	Yes	Yes	—	Yes	58db	Serial	NA	3K bytes	3,000 hours	8 million char.	Yes	Yes	$895

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Thriving

CONTINUED FROM PAGE S2

products' inability to compete with other, newer products. Laser printers are faster and provide graphics capabilities. The 24-pin printers are faster in letter-quality mode, provide the option of draft output, produce graphics, may print in color and are price-comparable. The 9-pin printers are less expensive, offer near-letter-quality and draft printing options, produce graphics and are faster for those users who do not need the level of quality a daisywheel provides.

Daisywheel manufacturers now promote their products as niche products. They forgo the mass market and appeal to one or more particular segments of the market. Some of the more successful application segments in which daisywheel printers are marketed include the legal profession, the government and the education market.

Universal features

In an attempt to avoid a recurrence of the fierce price competition that plagued the printer industry during its early growth years, printer manufacturers now compete with each other by adding value to their products. Some of the features users currently find in the more innovative products and will soon find on all printers include the following:

- **Reduction in size**. Printers with a smaller footprint and a lower profile.
- **Improved paper-handling abilities**. Built-in sheet feeders, automatic feeders to load tractor paper, an easy way to feed envelopes, alternate paper paths — bottom, front and rear feeding — and multi-bin sheet feeders that are reliable, easy to use, easy to override and cost about 10% the price of the printer.
- **Less noise**. A continuing reduction in overall noise level of the printer, without sacrificing speed. Currently, some printers offer a quiet mode, which reduces noise appreciably but slows the printer. In the case of C. Itoh's C-815 Supra, quiet mode is rated at 48dba — an impressive rating, since some laser printers are rated at 52dba.
- **Improved displays**. First promoted by Star Micronics America, Inc. on its Model NB-15, the use of LCD and LED displays will increase and will explain the status settings and functional options of the printer. The need to access DIP switches will be obsolete.
- **Font cartridges** (or the newer font cards). Cartridges will be made available on all printers. They will hold more fonts and be inexpensive to buy.
- **Expanded memory**. The amount of memory resident in the printer will increase. Some new models offer 42K bytes as standard, equivalent to about 21 pages of text. A large printer memory is a tremendous asset when printing graphics or long documents.
- **Better ribbons**. Special ribbons are being made available to enhance the appearance of printed output. A number of vendors are now beginning to promote the use of multistrike film ribbon. Ribbons, in general, will improve in quality and last longer.
- **Color printing**. What used to be an expensive option is now standard equipment on most high-end printers and a $100 option for the mid-range. Software support is limited for color printers, as is the

Continued on page S8

New options rejuvenate matrix market

BY ANGELE BOYD

A few short years ago, gloom was forecast for the serial dot matrix market, and a significant vendor shakeout was expected. That this did not happen is due, in large part, to high-resolution dot matrix printers — namely 24-pin printers.

According to International Data Corp. (IDC) research, all serial dot matrix printers had a 16% unit growth rate in 1986, topping overall printer market growth. Accounting for about 9% of all serial dot matrix printers, 24-pin printers shipped at close to a 200% growth rate in 1986.

The beneficiary of this trend is the end user, who can now quite easily find a printer to fit his application needs and his pocketbook. Nine-pin printers sell for as little as $250 to $350 for low volume, draft-quality output. For slightly more — between $500 and $750 — an end user with moderate volume and near-letter-quality output needs can also find a suitable 9-pin printer. For even faster speed with near-letter-quality output, 24-pin printers may be more appropriate. These list between $700 and $750 for a narrow-carriage version and between $1,000 and $2,000 for a wide-carriage version.

Price/performance choices

Two factors account for the price/performance choices currently available to end users: the growing presence of nonimpact technologies and price cutting by Japanese vendors.

Nonimpact influence. Nonimpact printers are probably the driving force behind the enhanced features and falling prices offered by serial dot matrix vendors. The advent of the nonimpact desktop laser in 1984, with its letter-quality print, relatively low noise level and speeds faster than available desktop printers, sparked interest in other technologies having some or all of these qualities. High-quality output is rated No. 1 in importance by end users, according to IDC, and serial dot matrix printer vendors are responding to that need.

To address print quality, vendors have put more print wires, or pins, in the heads of 24-pin dot matrix printers, and, in the case of 9-pin models, they offer a near-letter-quality mode in which the printer makes a double pass over printed characters. The difference between the two approaches is speed and price. Twenty-four pin printers achieve better quality output than do 9-pin printers in a single pass. In making a double pass to achieve comparable quality, 9-pin models suffer speed degradation. Twenty-four-pin printers, typically higher priced than 9-pin types, are expected to break the $500 barrier shortly; 9-pin prices will likely fall accordingly.

After quality of output, speed is rated second in importance, according to IDC — on par with price, software support and flexibility — and, again, vendors are responding to demand. They must now compete with speeds offered by low-end page printers — a 6 page/min laser printer is about the equivalent of a 300 char./sec. serial printer. Twenty-four-pin devices typically offer draft speeds of 180 char./sec. to 240 char./sec.

Nine-pin printers will stabilize at prices less than $500. Twenty-four-pin pricing will stabilize between $500 and $800. At these prices, 24-pin printers will fit nicely between 9-pin devices at the low end and laser printers at the high end.

Japanese price cutting. The recent price cutting by vendors such as Epson America, Inc., Star Micronics, Inc., Fujitsu America, Inc. and Panasonic Industrial Co. is a strategic response by the Japanese to the appreciating yen and IBM's recent announcement of its Personal System/2.

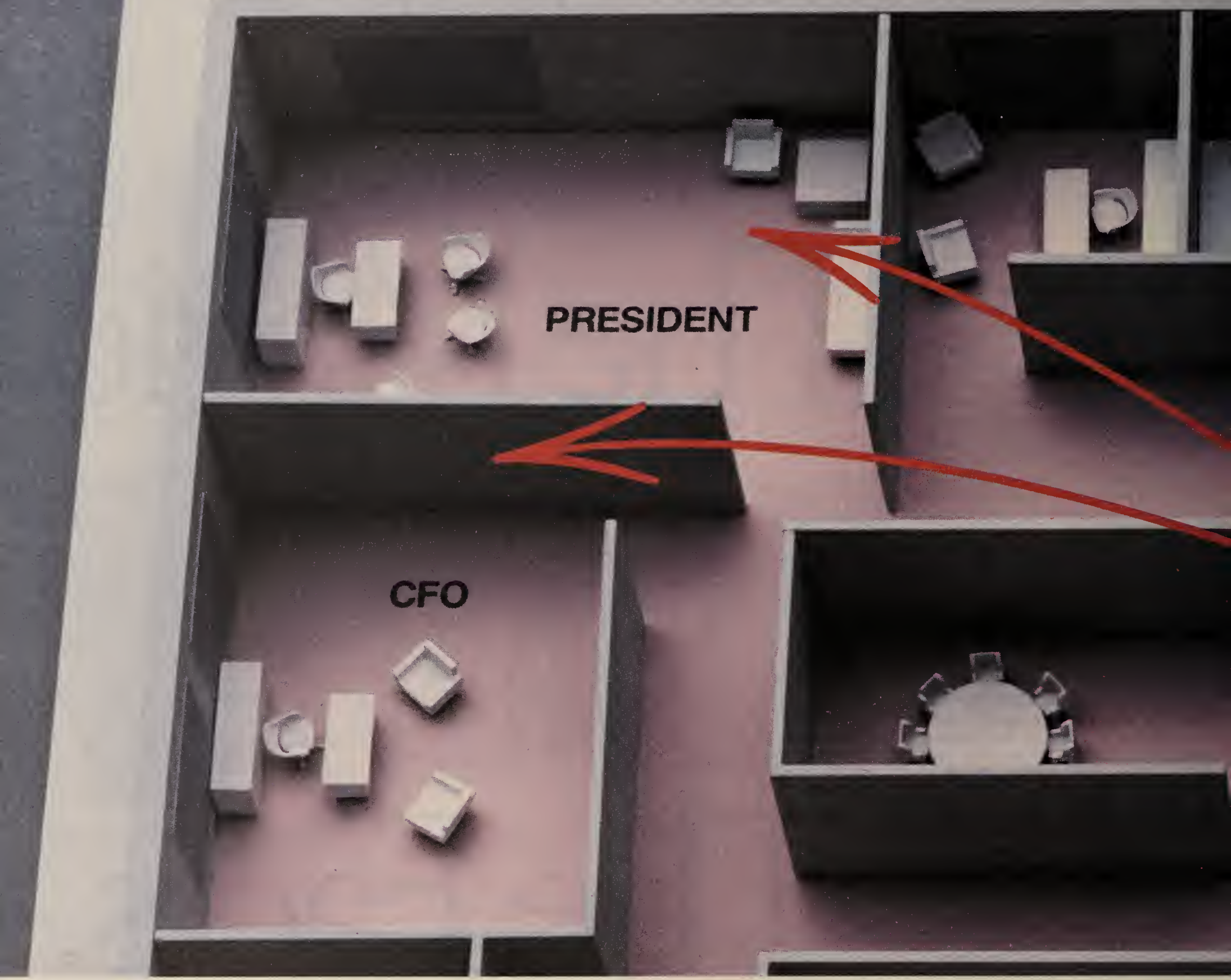
The price cuts indicate that the Japanese will continue to offer low prices in spite of yen appreciation. Their worldwide market presence allows them to achieve volume production efficiencies that result in competitive products, price-wise. Their adeptness at currency risk management (including locating manufacturing facilities in countries with weak currencies such as the U.S.), allows them to mitigate the effects of the strong yen.

Japanese vendors are somewhat justified in their concern about IBM's recent system and printer announcements. IBM's products have been favorably reviewed, and IBM does not have to contend with a currency dilemma, assuming the dollar remains weak.

The future for the serial dot matrix market looks bright. This technology will continue to account for close to 60% of all printers shipped in 1991. Despite a slight dip in share, 9-pin devices will remain dominant throughout 1991. Twenty-four-pin printers will continue to fall in price and grow in share, and by 1991 they will account for approximately 19% of the serial dot matrix market. •

Boyd is a research analyst for the Printer Market Program at International Data Corp., a Framingham, Mass.-based market research firm.

OUR NEW PINWRITER WHERE NO OTHER MATRIX



The executive suite. Until now, dot matrix printers just weren't welcome there.

They were too noisy, for one thing. But even more important, they couldn't deliver the quality top executives demand.

Dear Stockholder:

Actual print sample from a Pinwriter P9XL printer.

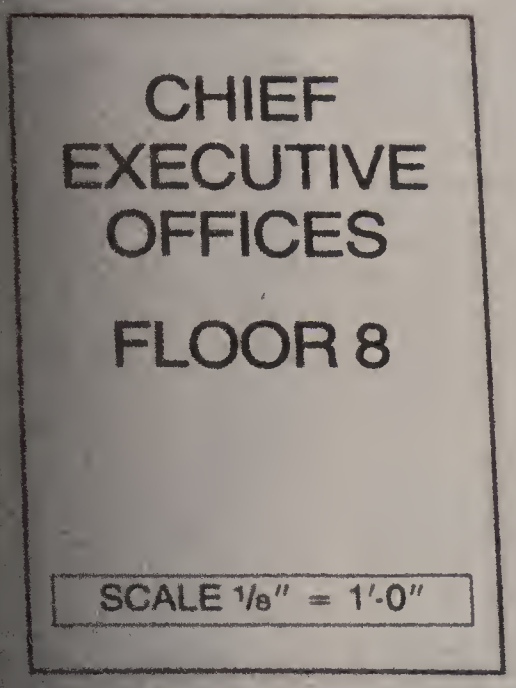
But now there's the XL series from NEC.

Our Pinwriter® XL series printers have multistrike film ribbons that produce true letter-quality documents—the kind any executive would be proud to sign. They print in 8 different colors—on paper or transparencies—to make charts, graphs and executive presentations more impressive. And they're the quietest matrix printers you've never heard.

They're also fast. Take our new Pinwriter P9XL, for example. It's over 30% faster than most other printers in its price range, with nearly twice as much memory to

C&C Computers and Communications

XL SERIES BOLDLY GOES PRINTERS HAVE GONE BEFORE.



handle the really big jobs—including payroll, invoices, continuous forms, and multi-page reports.

Executives will also be pleased to learn that the Pinwriter XL printers, like all NEC printers, are built to run an average of 5 years before they might need a repair. In fact, they have the highest reliability ratings in the industry.

So make an executive decision. Call 1-800-343-4418 (in MA 617-264-8635) and ask for the name of the NEC dealer nearest you. Or write to NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

NEC PRINTERS. THEY ONLY STOP WHEN YOU WANT THEM TO.

NEC

NEC Information Systems, Inc.

Thriving

CONTINUED FROM PAGE S4

actual use of color printing among those users who have it available to them. Analysts continue to tie the slow development of color printers to the slow growth of color copiers.

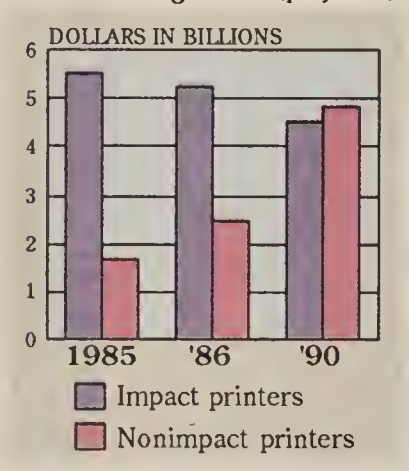
• **Increased reliability**. When 24-pin printers were introduced, critics claimed the print heads would wear out faster and break more often because of the thinner pins. Currently, most 24-pin printers have print heads that are projected to last for 200 million characters; some print heads are even rated as high as 400 million characters. In comparison, 9-pin print heads, which are less expensive than 24-pin, are typically rated at 100 million characters, while some heavy-duty print heads are rated at 500 million. Print head reliability will soon cease to be an issue; the number will be so high that no one will care.

Pricing pressures

The entire printer industry faces severe price competition, and the impact segment is no exception.

Printer revenue trends

Impact vs. nonimpact — 1985 (actual) through 1990 (projected)



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Daisywheel printers, as noted earlier, face price competition from 9-pin printers on the low end and from both laser and 24-pin printers on the high end. The outlook for daisywheels is bleak, according to Frank Rexach, printer products manager at C. Itoh Digital Products. "The daisywheel market has been drastically affected by the laser printer — and it's going away fast, except in some niche markets," he says.

The largest segment of the impact printer industry, in terms of total unit shipments, has been the lowest end of the marketplace. Traditionally, this segment has been dominated by printers with print speeds of approximately 120 char./sec. However, that situation appears to be changing.

At the Comdex/Spring '87 trade show in Atlanta, Epson premiered its $269 Model LX-800, which features rated print speeds of 10 char./in. of 150 char./sec. for draft quality and 25 char./sec. for near-letter quality.

According to Epson's Cox, "a little over two years ago, the mid-range was 160 char./sec. — these products are now at 200 to 240 char./sec. We see an escalation in the print speed, the ease-of-use features incorporated in the print speed and the ease-of-use features incorporated into today's dot matrix printers — and that trend will certainly continue."

Epson's main competition for this product comes from Citizen America Corp. with its Model 120D, which sells for $249, Star Micronics, whose Model NP-10 costs $279, and Panasonic Industrial Co., whose Model KX-P1080I sells for $329. Although priced competitively, these units are rated at draft printing speeds 20% to 33% slower than the Epson model.

One of the newer aspects of the 9-pin printer market is also facing a new wave of price competition. The high end of that market — Epson's EX-800 and EX-1000 — is currently priced at $599 and $799 for a 250 char./sec. draft-quality and 50 char./sec. near-letter-quality printer (for narrow and wide carriages), respectively.

Just a year ago, the same two printers sold for $749 and $995, respectively. Battling these two 9-pin printers are 24-pin printers priced at $699 and $995 (narrow and wide carriage), with print speeds of 180 char./sec. draft and 60 char./sec.

letter quality.

What about this overlap? Epson's Cox says, "The high-speed 9-pin printer should be the product of choice for someone doing a lot of high-speed accounting/spreadsheet work, where letter quality is not their real requirement. Someone whose primary application is correspondence and business reports should be moving toward 24-pin for the letter-quality mode." As for the future, he adds, "It will evolve that 24-pin will take over the mainstream, and 9-pin [high-speed] will become a niche-type product — but that evolution is going to take a while."

In addition to competing with 9-pin printers on the low side, 24-pin printers are also facing pressure from laser printers on the high side of the spectrum. Prices of laser printers have plummeted to less than $2,000. Many 24-pin impact printer models are priced within a few hundred dollars of that mark.

According to Gary Bailer, group marketing manager of peripherals at Panasonic, "We fully envision lower priced laser printers, and what that will do is cause the dot matrix impact printers to drop in price, improve in print quality and get easier to use."

C. Itoh's Rexach supports the idea that product selection will be based on applications. He comments, "I think [24-pin printers] will be hurt [by laser competition] if people were using them for word processing applications. . . . I think they won't be hurt where people need the advanced paper handling, where they use continuous preprinted forms and multipart forms because laser printers haven't caught up with that. Lasers are primarily for heavy word processing and graphics applications."

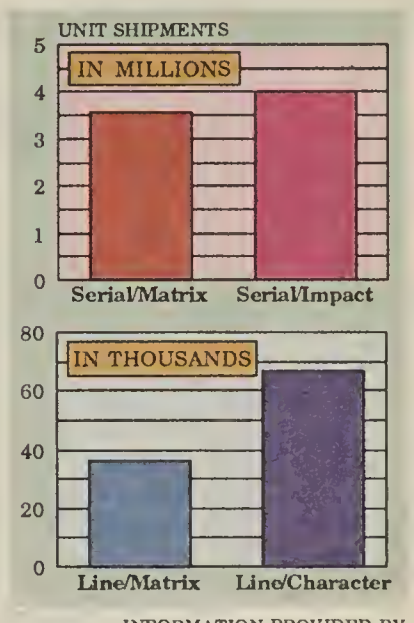
There are trade-offs whenever two alternatives are being considered to solve a problem or fulfill a need. The battle between impact and nonimpact printers is certainly no different. In most situations, the choice will become apparent once the short- and long-term criteria have been properly weighed and evaluated.

What follows is a list of strengths of impact printers in relation to nonimpact printers. The influence these characteristics will have on your buying decision depends on your specific needs.

- They typically have higher duty cycles.
- They are able to operate in harsher industrial environments.
- They can accommodate multipart forms.

Impact printer market

1986 U.S. unit shipment shares by type



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- They carry a lower initial purchase price.
- They are less expensive to maintain.
- They are simpler to maintain.
- They may have the ability to print in color.
- They provide more software support.
- They require no warm-up time.
- They are easier for the occasional user to operate.
- They are sometimes faster (in draft quality) than certain nonimpact printers when printing single copies of a given document.

While no one can predict the future with certainty, what is clear is that printer models will come and go — some lasting longer than others. As printing technologies evolve, impact printers will continue to play an important role in satisfying the printing needs of the end user. •

VENDOR VIEWPOINT
Don't be blinded by glint of cutting edge

BY ALEX SCHIBANOFF

Lesson One in Marketing 101 is that customers don't buy drill bits — they buy holes. In the rush to be first with the latest technology, many companies in the microcomputer industry, including printer manufacturers, have overlooked this simple lesson. They have permitted themselves to be overcome with technological wizardry at the expense of neglecting the practical needs of their customers.

What has happened in the printing industry is that engineering has triumphed over marketing, and technology has outpaced practical application. Color printers are just one example. Manufacturers have invested millions of dollars to develop color printers that are supported by no known software and for which there is no known practical application.

Not only have many manufacturers jumped into exotic technologies without considering the customer, they have abandoned their existing customer base in the process. There are, for example, an amazing number of printers on the market today that do not offer sheet feeders. Many manufacturers apparently see their responsibility as limited to offering a print head mounted to a platen, irrespective of the type of document their customer might want to produce.

Printer manufacturers need to look at the applications for a printer and address those applications. Contrary to popular belief, the majority of computer users today use dot matrix printers. Some 60% to 70% of all printers sold today are dot matrix. The second largest group of users choose daisywheel printers. Other, newer technologies account for a small portion of the printer marketplace.

Better forms handling, easier feeding of single sheets, convenient envelope printing, a more user-friendly selection of type fonts and simpler changing of ribbons would open more markets for printer manufacturers than sexy new technologies that are beyond the needs and budget of the average computer user.

This is a lesson the American automobile industry learned the hard way. Cars grew bigger until no one could afford to put gasoline in them, and consumers began to look elsewhere for their transportation. Ultimately, the auto manufacturers shifted toward practicality — more fuel-efficient models and speedometers adjusted to road rather than raceway speeds. Ground was lost that may never be made up, however, because companies were too caught up in their own agendas to listen to the buying public.

> THE slow sales of laptop computers are the result of one simple factor — very few people need a computer while riding on a bus, train, plane or mule.

One of the most important points made in Tom Peters' bestseller, *In Search of Excellence,* is that the "excellent companies" are close to their customers. They do not permit technology to cloud their vision. The time has come for those of us in the microcomputer industry to spend more time with our customers and less effort attempting to outdo each other with the latest technological marvel.

The original IBM Personal Computer was a simple machine made from common parts. It computed well, was fairly reliable and affordable and was supported by software that addressed practical applications. The slow sales of laptop computers are the result of one simple factor — very few people need a computer while riding on a bus, train, plane or mule. People still buy, use and appreciate dot matrix and daisywheel printers because they are affordable, easy to use and practical. Nothing prints a spreadsheet faster and easier than a dot matrix printer; nothing produces clean, crisp, letter-quality text better than a daisywheel printer. They are not the latest technologically — they are simply practical.

As we begin to tie computers and printers together into networks, new applications will arise that will open up fresh markets for old technologies, for new technologies and for technologies we have not yet dreamed of. Change will come, but it will come at a pace dictated by user readiness. •

Schibanoff is director of marketing for Brother International Corp.'s Information Systems Division in Piscataway, N.J.

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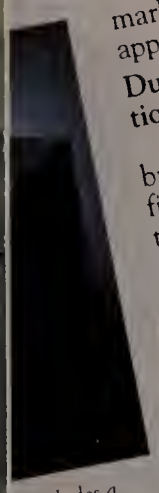

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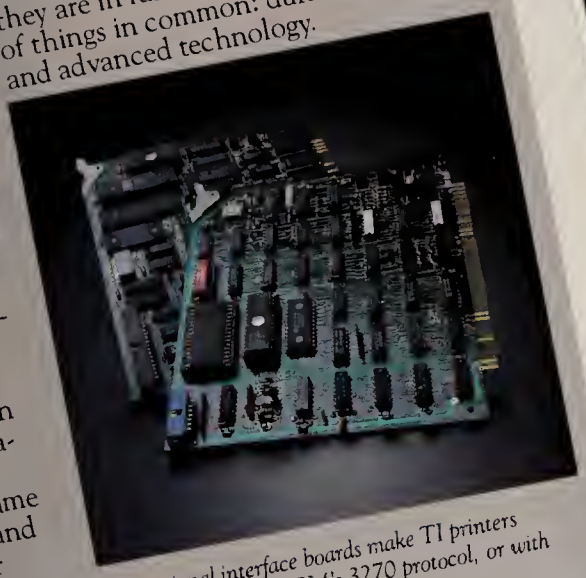
market, they can help in virtually any application.

Durability and technology. A combination that's engineered to work for you.

As you can probably tell, there's a broad range of TI printers designed to fill most any need. And as different as they are in function, they have a couple of things in common: durable design and advanced technology.



Optional interface boards make TI printers compatible with IBM's 3270 protocol, or with System 34, 36 or 38 minicomputers.

At Texas Instruments, building printers that deliver these qualities isn't just a goal, it's a commitment. We call it putting TI technologies to work on paper. And all you need to do to put it to work for you is call us toll-free at **1-800-527-3500.** Call us soon. Because with your input, we can get to work on improving your output.

TEXAS INSTRUMENTS

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...s to advanced, second-genera... engines and proprietary TI ...s, we've created a family of ...ers that offers improved compatibility and up to 10 times the duty cycle, 15 times the machine life and five times the paper capacity of their first-generation counterparts.

For example, first-generation lasers were capable of handling 3,000 pages per month. But with TI OmniLaser™ Printers, you can produce as many as 25,000 pages a month, and at speeds of eight and 15 pages per minute.

It's what we put into OmniLaser Printers that makes their output so special.

OmniLaser Printers combine advanced electro-photographic technology with the latest semiconductor technology. Text and images are produced with outstanding resolution by addressing over 7.5 million dots on each page. But since each dot occupies a separate area of memory, it takes large-scale processing and memory power to manipulate, store and print these documents.

TI's expertise in semiconductor technology allows us to create specialized components to provide laser printer users with increased ease-of-use, reliability and power.

That's why our OmniLaser Printers perform so well. Because when it comes to semiconductor technology, TI wrote the book. Starting with our invention of the integrated circuit back in 1958, and continuing today with our MegaChip™ technologies that produce advanced semiconductor systems-on-a-chip, nobody has done more to increase the power, density and capability of the devices that are becoming the heart of laser printers.

The intelligence inside an OmniLaser Printer is a case in point. It's a proprietary TI controller that's so powerful, it has more sheer processing capability than you'd find inside an IBM® PC AT™ computer.

We also made our OmniLaser Printers easier to operate. Because when you've been building printers as long as TI has, you develop an understanding of ergonomic factors. Like the convenience that comes from placing virtually all of the operator controls on an easily accessible front panel.

With PostScript®, the integration of text and graphics is anything but an afterthought.

PostScript, a standard in the desktop publishing industry, is a page description language that lets you control the placement, size and appearance of every element in your document. It's supported by both the OmniLaser 2108 and 2115 models, and with it you can produce cleaner, clearer, more professional output than was ever previously possible.

The OmniLaser Printer family also includes models that emulate the features of many printer standards, including HP LaserJet Plus, HPGL and IBM Pro Printer™, and since they're compatible with IBM, Apple® and others, there's an OmniLaser printer that's right for most applications.

These convenient plug-in cartridges provide for easy font selection, either manually or under software control.

The TI printer family includes laser printers, forms printers, personal printers and high-output models designed for shared-resource environments.

▶ *See back page for more information.*

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Our family also includes shared-resource serial-impact printers.

Most shared-resource environments are pretty tough on the hardware involved. So it follows that the more widely your resource is shared, the tougher it'll need to be. Which is one good reason to consider our OMNI 800™ family.

Our Model 810, for example, has become the standard for heavy-duty system printers. Over the years, they've proved themselves to be so durable, most of the world's largest airlines depend on them for ticket printing.

Then there's our Model 880s, which feature high-throughput, near-letter-quality printing and high-resolution raster graphics for data processing environments. And just about the only maintenance they require is the occasional ribbon change.

Increase operator productivity and eliminate forms waste.

The latest addition to our printer family is the Model 885 demand document printer. Just like the other family members, it's designed to be rugged and offer superior paper handling. But its differences make it ideal for applications where space is limited and paper waste is a consideration.

We've added a zero tear-off capability that eliminates forms waste. Simply put, it uses just one form where most printers would also use a second. It's front-loading, handles up to five-part forms with ease, and thanks to its small footprint, fits on a desk or countertop.

TI's 885 demand document zero tear-off capability to eli

Mini or mainframe, ou connect to IBM.

Plug in TI's SNA/S and you can connect ble printers to your I quickly and cost-effe way, plug in the TI you can connect a T System 34, 36 or 3

The personal prin

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What every buyer should ask before purchasing a printer

BY DARIA HOFFMAN

When preparing to buy an impact printer, there are a number of factors you must consider. Ask yourself what types of documents you will want to produce; whether you will be using your printer for critical correspondence; what the estimated volume of printing is and whether that volume warrants a fast printing speed; how often, if ever, you will need to print graphics or print in color; and whether it is necessary to print multiple fonts on a page. Knowing the answers to questions like these will help you narrow the options.

Now that many dot matrix printers are living up to their "near-letter quality" claims, one of the first decisions you may have to make is exactly how critical text purity is, relative to other attributes. If you want true letter-quality text, such as that produced by a good typewriter, you will need a daisywheel printer or a thimble printer (whose printing element resembles that of a sewing thimble), both of which produce text of equivalent quality.

If, on the other hand, near-letter-quality text is acceptable, a dot matrix model would be a better choice. In fact, if you want fast draft speeds, graphics, color and easy printing of multiple fonts on a page, a dot matrix printer is the only choice among impact printers, since daisywheel models either do not perform these functions or do not perform them as easily.

Offsetting their unparalleled letter-quality output, daisywheel printers are much slower than dot matrix printers, averaging around 35 char./sec., compared with the draft speeds of 300 char./sec. or more of some dot matrix printers. Also, daisywheel models print graphics on a very primitive level, by repeating a character symbol, like a period, in desired locations. Although daisywheel printers allow for the use of different type styles, switching them is a cumbersome process involving removing and inserting the print wheels. In contrast, fonts can be changed with the press of a button on many dot matrix printers.

If you need both true-letter-quality text and high speed for drafts or one of the other features not available with daisywheel printers, you should consider a hybrid model like Brother International Corp.'s Twinriter 5. Technicians at Buyers Laboratory, Inc. (BLI) recently tested this model, which incorporates both a daisywheel printing mechanism (for 36 char./sec. letter-quality printing) and a dot matrix print head (for 140 char./sec. draft printing) and found it to be a reliable and economical solution for offices with a mixture of requirements.

Although virtually all daisywheel printers produce good letter-quality text, the quality varies on each.

> WHEN calculating the cost of a printer, you should never consider just the purchase price.

You can gauge the print quality of a daisywheel printer by looking carefully at the registration of letters in the output and at whether the characters are uniform in intensity. Also examine the spacing between letters, especially wide letters such as "M" and "W."

Dot matrix print quality

Among dot matrix units, print quality is highly variable. Although many of today's inexpensive 9-pin printers produce good near-letter-quality text, the individual dots used to form the characters are more visible on some models, and, in graphics representations, some models print text with lowercase letters run together.

In the more expensive 18- and 24-pin range, print and graphics quality is significantly better. The quality of the output produced by some 24-pin dot matrix printers is so good that only close examination will reveal any imperfections in the characters.

The increased number of pins in the print head — 24 or 18 instead of 9 — is significant to the difference in quality, but it is not the only reason. Other pertinent factors to consider are the printer's graphics resolution, which may range from 70 by 84 dot/in. to 360 by 360 dot/in., and the density of the dot matrix, which may be as high as 36 by 24 pins.

Horizontal and vertical spacing also affect output quality. On some printers, for example, the print head can be moved horizontally in increments of 1/360th-in. at a time, while on other models it can only be moved 1/120th-in. The smaller the distance, the more precise the placement of dots and the more perfectly formed the character.

The truth about speed

Because of its effect on productivity, speed is an important qualifying characteristic of printers. Bear in mind that most printers will operate more slowly than their rated speed. Not only will the type of document have an effect on print speed (for example, documents with graphics or complicated formatting take more time to print than straight text), but manufacturers rate their printers' speeds according to different standards.

With most printers, speed weighs heavily in the price. Daisywheel models that cost $500 or less have slow speeds, from about 15 char./sec. to about 25 char./sec. Models priced from $500 to $1,000 may have speeds of 45 char./sec. and higher. Although generally much slower than dot matrix models, some daisywheel printers can rival the speeds of dot matrix models in their near-letter-quality modes. The Primages 90GT daisywheel printer from Primages, Inc., priced at $1,095, claims a 90 char./sec. print speed. According to the manufacturer, this model can also print graphics (emulating the Epson America, Inc. FX-80).

While moderately priced dot matrix printers are rated from about 180 char./sec. to about 300 char./sec. for draft mode and from about 60 char./sec. to about 100 char./sec. in near-letter-quality mode, some models are extremely fast. For example, the Mannesmann Tally Corp. MT 490, priced at $2,699, boasts a 400 char./sec. draft speed and a 150 char./sec. near-letter-quality speed.

Questions of compatibility

Some printers feature both parallel and serial interfaces, while others can be configured either way. A few may offer only one or the other, so it is important to know which interface your computer uses. Computers with both parallel and serial interfaces usually use the parallel interface for connection to a printer and the serial for data communications.

Also, be sure the software you use includes a driver for the printer you are considering. If a printer emulates popular models that have become industry standards, you can be assured that most industry-standard software can be used with that printer.

Any printer you buy — daisywheel or dot matrix — should emulate Xerox Corp.'s Diablo 630. Other emulations to look for in dot matrix printers are the Epson FX series and the IBM Graphics Printer.

It is also a big plus if a daisywheel printer is compatible with industry-standard supplies like print wheels and ribbons. Diablo 630-compatible daisywheels and Diablo Hy-Type II ribbons are widely available.

It is probably a good idea to ask the sales representative to verify whether print wheels and other options listed on paper actually exist. BLI, for instance, was shown a list of 100 optional print wheels for one major brand unit, but when we pursued those options, it turned out that only three or four were obtainable. It seemed there had not been enough customer demand for some of the styles, and so the wheels were never produced.

Paper and memory size

Many shortcomings of printers involve paper handling. Often, paper insertion is inconvenient or even impossible without optional feeders. But optional feeders can be plagued by problems like jamming.

You should ascertain whether the printer you are considering allows automatic loading of single sheets of paper. This feature is a major convenience and one that merits comparison shopping, since some expensive units do not have it and some inexpensive ones do. You should also check the availability and price of accessories such as sheet feeders. Some models come with built-in tractor feeders and automatic cut-sheet feeders, while with others feeders are available as an option. While tractor feeder prices may range from less than $100 to $200 or more, cut-sheet feeders vary widely in price, ranging from less than $200 to close to $1,000.

> BEAR IN mind that most printers will operate more slowly than their rated speed. Manufacturers rate their printers' speeds according to different standards.

Paper accommodation is another point that should not be ignored. No printer is a good choice if it cannot handle the types and sizes of paper you will be using. Envelope feeders, if they are available at all, are usually optional.

Another means of judging a printer is by the size of its buffer — memory that stores text coming from the computer. You will probably want at least an 8K-byte buffer. With too small a buffer, printing will be slowed down, and you will not be able to do other tasks while a document is being printed.

Calculating real cost

The prices of daisywheel printers range from less than $500 to close to $3,000, with speed contributing a substantial amount to the variance. Nine-pin dot matrix printers range in price from about $300 to about $1,000, and 24-pin models vary from roughly $800 to more than $2,000.

When calculating the cost of a printer, however, you should never consider just the purchase price. Take into account the life expectancy and the cost of consumables such as print heads and daisywheels, supplies and the serviceability of the machine. (For example, can a dot matrix print head be replaced easily by the user, or will a service call be required?) If an inexpensive printer can use only proprietary ribbons that are either expensive or have a low character yield, that "inexpensive" printer will wind up being a very expensive one in the long run.

Ease of use cannot be overestimated as a determinant of long-term satisfaction, so it is important to consider whether fonts and other controls can be selected conveniently with push buttons on the front of the printer or by hard-to-reach DIP switches. Check also to see if print wheels can be easily inserted and removed.

One of the biggest drawbacks of impact printers is their level of noise. Some are louder than others, so either choose a printer with a noise level you will not find too distracting or be prepared to buy an acoustical enclosure. Some dot matrix printers, such as models manufactured by NEC Information Systems, Inc., have "quiet" switches that reduce the noise level, but there is a downside to this feature: The noise reduction is accompanied by a reduction in print speed.

Once these points have been covered, ask the vendor about the printer's mean-time-between-failures rate and the recommended monthly print volume. The answers to these questions will give you a sense of how reliable a printer is, whether it is muscular enough to handle the required work load. Then, as a final, definitive test, bring your software into the store and have the salesperson demonstrate the printer by printing one of your company's typical documents. If a dealer will not do it, take your business elsewhere. •

Hoffman is assistant managing editor with Buyers Laboratory, Inc. in Hackensack, N.J., an independent office products testing laboratory.

PRODUCT FACE-OFF

NEC's P7 vs. Toshiba's P321 at 24 pins

BY JAY LUCAS

If you are searching for a versatile printer, it is a great year to be shopping. The reason? Twenty-four pins.

Until now, when you purchased a system, you had to commit yourself to a lifetime purpose for the printer. If the printer was intended for the technical or budget staffs, which needed a fast machine to get projected profits onto paper, you bought a dot matrix. But if the user was a manager or professional, who sends documents to the customer or the boardroom, nothing but a daisywheel printer would do.

Twenty-four-pin printers offer an attractive compromise; they can pump out paper spreadsheets as easily as they can manicure managerial reports for the home office. These printers are capable of exceedingly fast draft printing in the typical dot matrix format and yet, in letter-quality mode, can produce formed characters close to the quality of that available from the daisywheels. While last year the technology was available in only a handful of machines, 1987 has seen 24-pin printers come into their own.

Competitive siblings

Two of the biggest selling 24-pin printers include the NEC Information Systems, Inc. Pinwriter series — specifically the P7 — and the Toshiba America, Inc. P321. The former is a wide-carriage model, the latter a narrow, but each is available in the other format. They are positioned by price to compete directly against each other; however, each offers users a slightly different set of features.

Both machines claim a maximum print speed of 216 char./sec. in draft mode. Although that breakneck speed is never achieved in throughput, both units print at least two 80-char. lines of totally legible type each second. In letter-quality mode, NEC claims a speed of 65 char./sec. on its P7, and Toshiba rates its P321 at a slightly higher 72 char./sec.

Both units allow a versatile selection of character fonts. Toshiba's P321 has three sources for its character sets: It has a built-in set of fonts, it can receive character fonts from the computer, and it can accept cartridges with extra fonts. The NEC P7 derives fonts from only the first two sources.

Consider for a moment the built-in fonts of each machine. The Toshiba offers a draft font and two types of letter-quality fonts, each with variations. The first set of letter-quality fonts contains true Elite and Courier font emulations. In addition, the Toshiba offers a proportionally spaced letter-quality mode, in which characters are formed in as close to a printed shape as we have seen.

The NEC P7 offers in its resident fonts six pitches (10, 12, 15, 17, 20 and high-speed) in draft mode, each with an italic variant, and letter quality in 10, 12 and 15 pitch. A letter-quality proportional bold font is also available. Although the proportional font looks quite presentable and is equivalent in quality to many daisywheel printers, the Toshiba printer has the edge on fully justified print with its Qume Corp. Sprint 11 emulation and micro justification, which allows extra spaces in lines to be fully distributed between letters.

The NEC printer offers a bidirectional tractor feed, which allows graphs and charts to be more accurately placed on the page as the paper shuffles up and down in the printer. It also features automatic paper loading. The NEC P7 tends to operate more quietly than the Toshiba printer, making it a less disagreeable member of the office staff.

The Toshiba P321 is available with both a parallel and serial interface and has a well-developed library of special fonts available on disk.

Both the Toshiba and the NEC are excellent, reasonably priced, solid printers. For users whose applications lean more toward spreadsheets and charts, the NEC P7's superior selection in draft mode, bidirectional tractor and paper-handling features give it the edge.

On the other hand, for users who demand crisp, clean, high-quality output, the Toshiba P321 would be the better choice. It currently boasts more and better fonts, better word processing versatility and a nicer final product.

However, with neither product do you commit yourself. For the boardroom or the back room, either printer will shine. •

Lucas is a management automation specialist at the U.S. Patent & Trademark Office in Washington, D.C. He has specialized in user interface issues for 10 years. Rich Barnett of Printers Plus in Alexandria, Va., assisted in researching this article.

A purist approach to selecting a printer

Would you be so bold as to buck the industry trend? Do you dare ignore the 24-pin revolution? How could you counter the persuasive propaganda about the machines that "do everything?" What other choice is there?

• **Going up** — Law firms, corporate home offices and sales people, to name a few, need the certain look and feel of a crisp letter hammered out on an impact printer, duplicating at high speed the formality of the individually typed letter.

• **Going down** — Workers in labs and control offices need data on paper — often wide paper with horizontal green bars — to accumulate their numbers for the 277th pay period routine sales total. Don't talk about fancy to them; just be sure the printer is reliable and cheap.

• **Going on** — It's not by chance that Toshiba America, Inc. offers a print head rebuilding kit among its accessories. The impact wires in a 24-pin machine are a hairbreadth 0.2mm in diameter. Though great care and massive supports keep the pins striking in the proper place, not all the bugs have been worked out of these printers.

Should, for any of these reasons, 24-pin printers not be for you, let's look at two other directions, along with representative printers in each class.

Daisywheel printers used to be the printer of choice for users trying to avoid the look of discrete dots. Today that technology is challenged on two fronts and is losing much of its profitable territory.

From the ranks of the less expensive machines come 24-pin printers, which combine the high-quality print of the daisywheel with the versatility of different fonts, italics and character sizes. From the high end come the legions of lasers, which, for as little as $1,500, create near-publication-quality imprints with fonts, size control, graphics, reductions and expansions and a host of other page-control features. Will the daisywheel survive? Possibly. Does it have a place in today's market? Absolutely.

The C. Itoh Digital Products, Inc. Starwriter D10-40 can print up to 31 char./sec. and create crisp, letter-quality work that matches its Diablo and Qume counterparts. It is moderately quiet, with a massive cabinet that smooths the clacking into a mild background noise. The sheet feeder and bidirectional tractor feeder are reliable and, like the 33-lb workhorse itself, are built to produce high-quality letters on a production basis. It is fully compatible with the industry-standard control codes for the Diablo 630, which have become an industry standard, so no special programming will be needed on installation.

Using a daisywheel printer does not mean you must sacrifice all printing pleasantries — just those that require changes of letter shape. Italics, for instance, are impossible to achieve without a wheel change. However, bold, overstrike and underline modes — even shadow effects — are available from an intelligent machine such as the C. Itoh printer, which can microcontrol the print head to shift a little through multiple striking of the letter. The results are impressive, exactly simulating the crispness of your office IBM Selectric typewriter.

In addition, the Starwriter offers an 8K-byte buffer. This large repository is handy because most letters and other short documents (up to 4 pages) can be sent directly from the computer to the printer in one gulp, freeing the computer to get on to its next task.

The Starwriter D10-40 lists for about $1,000, but accessories are expensive. Tractor feeders cost $250 or so, and sheet feeders can list for up to $700, depending on the number of bins. However, if in your business the medium is part of the message, then this technology is a strong choice.

The 9-pin workhorse

It is virtually impossible to be at all interested in computers and not be intimate with one or more of the hundreds of 9-pin dot matrix printer models. There is no more cost-efficient way to change screen text into paper text. This sector features a great many efficient, reliable, high-quality printers, and brand loyalty is likely to be motivated more by secondary factors than by the machines themselves.

I like Panasonic Industrial Co.'s KX-P1080; it's a great little $319 printer, with a good mix of speed and correspondence quality, convenient paper handling and optional IBM print-standard compatibility. Others, however, swear by their Epsons; still others won't leave their Okidatas or Centronics or C. Itohs or any number of other vendors' products. In moments of honest reflection, I admit to myself that they all do about the same job, and those other factors — cost, service, office compatibility, ribbon availability and even color — take on more meaning in this class of service.

So be a purist. Avoid the 24-pin machines and be true to your requirements. Go up to daisywheels, and you'll have high-quality correspondence. Go down to the 9-pin printers and save a couple hundred dollars.

I'm sticking with my 24-pin though . . . and saving for my laser printer.

JAY LUCAS

Dot matrix printers

COMPANY	PRODUCT	NUMBER OF PINS	NUMBER OF STANDARD COLORS	GRAPHICS RESOLUTION (DOT/IN.)	LETTER/NEAR-LETTER-QUALITY SPEED (10 CHAR./IN.) (CHAR./SEC.)	DRAFT-QUALITY SPEED (10 CHAR./IN.) (CHAR./SEC.)	MAXIMUM PAPER WIDTH	NUMBER OF COPIES	NUMBER OF RESIDENT FONTS	NUMBER OF FONT CARD SLOTS	DIP SWITCH OR FRONT PANEL FONT SELECTION METHOD	RATED NOISE LEVEL	SERIAL OR PARALLEL INTERFACE	PRINTER EMULATIONS	INTERNAL BUFFER CAPACITY (STANDARD)	MEAN TIME BETWEEN FAILURES	PRINT HEAD LIFE	SHEET FEEDER OPTION	PRICE
Advanced Communications, Inc. (408) 734-9636	MP 8010	9	1	240	28	150	11 in.	4	4	—	DIP switch	NA	Parallel	Epson	8K bytes	NA	200+ million char.	No	$695
Advanced Matrix Technology, Inc. (805) 499-8741	AMT All-In-1 Office Printers	16	7	240 x 480	45	250	16 in.	5	4	0	Front-panel	55dba	Both	DEC LQP02, Epson MX, JX series, IBM 5182, Diablo C150 inkjet	6.5K bytes	8,000 hours	200 million char.	Yes	$1,645-$1,845
Alps America (408) 432-6000	P2400C	18, 24	7	60 x 240	125, 120	—	—	4	1	—	—	Less than 55db	Both	Epson FX-185, JX-80	4K bytes	6,000 hours	—	Yes	$1,295-$1,395
	P2000	9	1	240 x 216	50	—	—	6	1	—	—	Less than 55db	Both	Epson FX-100	4K bytes	5,000 hours	—	Yes	$995
	P2100	18	1	240 x 216	80	—	—	6	1	—	—	Less than 55db	Both	Epson FX-100	4K bytes	5,000 hours	—	Yes	$1,595
	ALQ200	18, 24	7	60 x 40	100, 80	—	—	3	1	—	—	Less than 55db	Parallel	Epson FX-185, JX-80, LQ-1500	7K bytes	5,000 hours	—	Yes	$595-$695
	ALQ300	18, 24	7	60 x 40	100, 80	200, 240	16 in.	3	1	—	—	Less than 55db	Parallel	Epson FX-185, JX-80, LQ-1500	7K bytes	5,000 hours	—	Yes	$895-$995
American Computer Hardware Corp. (714) 549-2688	POS 80	9	—	72 x 72	45	180	10.25 in.	5	2	0	DIP switch	Less than 60db	Both	None	2K bytes	—	200 million char.	Yes	Contact vendor
	POS 132	9	1	72 x 72	45	180	14.25 in.	5	2	0	DIP switch	Less than 60db	Both	None	2K bytes	—	200 million char.	No	Contact vendor
	POS 40	9	—	72 x 72	50	200	3.44 in.	2	2	0	DIP switch	Less than 60db	Both	None	2K bytes	—	200 million char.	—	Contact vendor
Anzac Computer Equipment Corp. (415) 475-4600	Anzac 1132	9	1	240	40	160	15 in.	8.5+ in.	2	0	NA	63dba	Twinaxial	IBM 5225	NA	4,000 hours	200 million char.	No	$1,595
	Anzac 1080	9	1	240	40	160	8.5+ in.	3	2	0	NA	63dba	Twinaxial	IBM 5225	NA	4,000 hours	200 million char.	No	$1,395
	Anzac 2250	9	1	240	60	250	15 in.	4	1	2	Front-panel	58dba	Twinaxial	IBM 5225	NA	4,000 hours	200 million char.	Yes	$2,995
	Anzac 2400	18	1	240	100	400	15 in.	4	1	2	Front-panel	58dba	Twinaxial	IBM 5225	NA	4,000 hours	200 million char.	Yes	$3,995
Atari Corp. (408) 745-2367	SMM804	36	1	60 to 120	—	80	11 in.	0	2	0	Front-panel	—	Parallel	Epson	—	2 years	2 years	No	From $250
	XMM801	13	1	60 to 120	—	80	11 in.	0	2	0	Front-panel	—	Atari serial	Epson	—	2 years	2 years	No	From $250
AT&T (800) 247-7000	Model 470	9	1	160 x 144	NA	120	10 in.	2	13	0	DIP switch	62db	Parallel	C. Itoh 810B, 810S	2K bytes	8,000 hours	2 million char.	No	$545
	Model 471	9	1	160 x 144	NA	120	15.5 in.	2	13	0	DIP switch	62db	Parallel	C. Itoh 810B, 810S	2K bytes	8,000 hours	2 million char.	No	$525
	473	9	1	160 x 144	NA	120	10 in.	2	2	0	DIP switch	62db	Parallel	IBM Graphics	2K bytes	8,000 hours	2 million char.	No	$545
	Model 474	9	1	160 x 144	NA	120	15.5 in.	2	2	0	DIP switch	62db	Parallel	IBM Graphics	2K bytes	8,000 hours	2 million char.	No	$795
	475	9	1	160 x 144	NA	120	10 in.	2	13	0	DIP switch	62db	Serial	C. Itoh 810B, 810S	2K bytes	8,000 hours	2 million char.	No	$595
	Model 476	9	1	160 x 144	NA	120	15.5 in.	2	13	0	DIP switch	62db	Serial	C. Itoh 810B, 810S	2K bytes	8,000 hours	2 million char.	No	$845
	Model 478	9	1	240 x 144	50	200	9.5 in.	5	2	0	Front-panel	56db	Parallel	IBM 5152 Model 2, IBM Graphics, Proprinter	16K bytes	8,000 hours	300 million char.	No	$1,034
	Model 5310	9	1	240 x 144	—	200	9.5 in.	5	11	0	Front-panel	56db	Serial	Communications to 9.6K bit/sec.	4K bytes	8,000 hours	300 million char.	No	$1,349
	Model 479	9	1	240 x 144	50	200	15 in.	5	2	0	Front-panel	56db	Parallel	IBM 5152 Model 2, IBM Graphics, Proprinter	16K bytes	8,000 hours	—	No	$1,244
Brother International Corp. (201) 981-0300	M-4018	18	1	—	100	400	136 col.	6	—	—	Both	Less than 59dba	Both	IBM, Epson JX	—	—	—	Yes	$1,695
	M-1724L	24	1	—	72	200	—	3	4	5	Both	—	Both	IBM Proprinter, Epson LQ-100, Diablo 630, Brother HR series	—	—	—	Yes	$899
	M-1509	9	1	—	45	180	16.5 in.	2	2	—	Both	Less than 55dba	Both	IBM, Epson	3K bytes	—	—	Yes	$599
	M-1709	9	1	—	50	240	—	2	2	—	Both	Less than 55dba	Both	IBM, Epson	24K bytes	—	—	Yes	$699
	M-1109	9	1	—	25	100	—	2	—	—	Both	—	Both	IBM, Epson, Apple	2K bytes	—	—	Yes	$299
	Twinwriter 6 Dual Printhead	—	1	—	200	—	—	—	—	—	—	—	Both	—	—	—	—	Yes	$1,395
Cal-Abco (818) 704-9100	Legend 808	9	1	194	100	100	10 in.	2	—	0	DIP switch	Less than 50db	Parallel	Epson FX-80	1 line	—	50,000 hours	No	$199
Canon U.S.A., Inc. (516) 488-6700	A65/X	18	1	240	34, 100	200	14 in.	3+	3	1	Front-panel	57dba or less	Both	IBM Proprinter	8K bytes	4,000 hours	400 million char.	Yes	Contact vendor

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY	PRODUCT	NUMBER OF PINS	NUMBER OF STANDARD COLORS	GRAPHICS RESOLUTION (DOT/IN.)	LETTER/NEAR-LETTER-QUALITY SPEED (10 CHAR./IN.) (CHAR./SEC.)	DRAFT-QUALITY SPEED (10 CHAR./IN.) (CHAR./SEC.)	MAXIMUM PAPER WIDTH	NUMBER OF COPIES	NUMBER OF RESIDENT FONTS	NUMBER OF FONT CARD SLOTS	DIP SWITCH OR FRONT PANEL FONT SELECTION METHOD	RATED NOISE LEVEL	SERIAL OR PARALLEL INTERFACE	PRINTER EMULATIONS	INTERNAL BUFFER CAPACITY (STANDARD)	MEAN TIME BETWEEN FAILURES	PRINT HEAD LIFE	SHEET FEEDER OPTION	PRICE
Capital Circuits Corp. (617) 787-2030	S-510 Receipt Printer	5 x 7	1	—	240 line/ min	—	40 col. (3.5-in. roll)	0	3	—	DIP switch	65db	Both	—	1K byte	30,000 hours	100 million char.	—	$740
	S-610 Slip Printer	5 x 7	1	—	180 line/ min	—	40 col. (6-in. form)	5	3	—	DIP switch	60db	Both	—	1K byte	30,000 hours	100 million char.	—	$760
	S-710 Multifunction Printer	5 x 7, 4 x 7	1	—	150 line/ min	—	40 col. (4.5-in. roll)	3	3	—	DIP switch	60db	Both	—	1K byte	30,000 hours	100 million char.	—	$805
CIE Terminals, Inc. (800) 854-3322	Triprinter 4000	9	1	144 x 144	87½	400	13.6 in.	3	12	1	Front-panel	58dba	Both	IBM Graphics, Apple Imagewriter, Epson FX series	2K bytes	6,000 hours	NA	Yes	$1,995
Citizen America Corp. (800) 556-1234 ext. 34	MSP-50/55	9	1	240 x 216	50	300	10, 15 in.	3	2	1	Front-panel	56db, 54db	Both	IBM Proprinter, Epson EX	8K bytes	5,000 hours	—	No	$549-$699
	Tribute 224	24	1	360	66	200	17 in.	3	2	1	Front panel	Less than 57db	Both	Toshiba 1340, 341, 351, Epson LQ-1000, Qume Sprint 5-11, Diablo 630	24K bytes	—	—	No	$699
	Tribute 124	24	1	360	66	200	10 in.	3	2	1	Front-panel	—	Both	Toshiba 1340, 341, 351, Epson LQ-1000, Qume Sprint 5-11, Diablo 630	24K bytes	—	—	No	$699
	120D	9	1	240 x 216	25	120	10 in.	1	1	0	DIP switch	—	Either	Epson, IBM	4K bytes	4,000 hours	—	No	$249
	MSP-20/25	9	1	240	50	200	10, 15 in.	2	1	0	DIP switch	—	Either	Epson, IBM	8K bytes	5,000 hours	100 million char.	Yes	$449-$599
C. Itoh Digital Products, Inc. (213) 327-2110	C-310/C-315 XP series	9	1	240 x 216	50	300	10, 15 in.	3	2	1	Front-panel	55db	Either	Epson FX-80+, IBM Proprinter	2K bytes	7,200 hours	100 million char.	Yes	$699-$899
	C-210/C-215 XP series	9	NA	240 x 216	45	180	10, 15 in.	3	2	NA	Front-panel	60db	Either	Epson FX-80+, IBM Proprinter	10K bytes	7,200 hours	100 million char.	Yes	$549-$699
	Prowriter Jr. Plus	9	1	240 x 216	30	160	10 in.	1	2	NA	Front-panel	60db	Either	Epson FX-80+	8K bytes	7,200 hours	NA	No	$369
	C-715 Reliant	24	7	180 x 360	83	250	16 in.	3	2	1	Front-panel	60db	Both	Epson LQ-1000, IBM Proprinter XL, Toshiba P351, Diablo 630	32K bytes	7,200 hours	100 million char.	Yes	$1,295
	C-815 Supra	24	1	180 x 360	135	333	16 in.	5	4	1	Front-panel	53db, 51db	Both	Qume, Toshiba P351, IBM Proprinter XL	42K bytes	7,200 hours	100 million char.	Yes	$1,995
C.Itoh Electronics, Inc. (213) 327-9100	9700	24	3	180 x 240	100	250	13.6 in.	3	19	1	Front-panel	60dba	Both	Diablo 630	32K bytes	NA	NA	Yes	$1,395
	9815	24	1	180 x 360	135	333	13.6 in.	3	11	1	Front-panel	60dba	Both	IBM Proprinter XL, Toshiba P351, Qume Sprint 11, Diablo 630	42K bytes	NA	NA	Yes	$1,995
Commodore Business Machines, Inc. (215) 436-4200	MPS1200	9	1	240 x 216	24	120	10 in.	3	2	0	DIP switch	—	Serial (proprie-tary)	Epson FX	2K bytes	4,500 hours	100 million char.	No	$299
	MPS1250	9	1	240 x 216	24	120	10 in.	3	2	0	DIP switch	—	Parallel	Epson FX	2K bytes	4,500 hours	100 million char.	No	$299
Copal (USA), Inc. (213) 618-0225	Write Hand series	9, 24	1, 4	360	85	255	16 in.	2	1	2	Front-panel	55db	Both	Epson, IBM Proprinter XL	8K bytes	—	100 million	Yes	$225
Dataproducts Corp. (603) 673-9100	Model 8070 Plus	18	4	168 x 84 or 165 x 82.5	100	400	13.2 in.	6	1	0	Front-panel	58dba	Either	IBM Color, Graphics, P series	4K bytes	4,000 hours	500 million char.	Yes	$1,999-$2,099
	Models 8050, 8052	9	4	168 x 84 or 165 x 82½	40	200	13.2 in.	6	1	0	Front-panel	65dba	Both (8050), Parallel (8052)	IBM Color, Graphics, P series	4K bytes	4,000 hours	250 million char.	Yes	$1,499-$1,599
	Models 8020, 8022	9	1	168 x 84 or 165 x 82½	30	180	13.2 in.	3	1	0	Front-panel	65dba	Both (8020), Parallel (8022)	IBM Color, Graphics, P series	2K bytes	500 hours	140 million char.	Yes	$720
	Models 8010, 8012	9	1	168 x 84 or 165 x 82½	30	180	8 in.	3	1	0	Front-panel	65dba	Both (8010), Parallel (8012)	IBM Color, Graphics, P series	2K bytes	500 hours	140 million char.	Yes	$535
Datasouth Computer Corp. (800) 222-4528	DS series	9	1	—	186, 40	220, 180	15 in.	6	1, 3	0	Front-panel	59db	Both	Epson MX-80, MX-100, IBM Graphics, Diablo 630	8K bytes	4,472, 4,217 hours	200 million char.	Yes	$1,395-$1,695
	CX series	9	1	—	186, 40	220, 180	15 in.	6	1, 3	0	Front-panel	59db	Parallel, coaxial	IBM 3287	8K bytes	4,472, 4,217 hours	200 million char.	Yes	$2,995-$3,495
	TX series	9	1	—	186, 40	220, 180	15 in.	6	1, 3	0	Front-panel	59db	Parallel, twinaxial	IBM 5256, 4214, 5224, 5225	8K bytes	4,472, 4,217 hours	200 million char.	Yes	$2,995-$3,495
	DS-CX-TX Demand Document series	9	1	—	186, 40	220, 180	15 in.	6	1, 3	0	Front-panel	59db	Serial, Parallel, twinaxial, coaxial	IBM 3287, 5256, 4214, 5224, 5225	8K bytes	4,472 hours	200 million char.	Yes	$1,695-$3,295

SPOTLIGHT

COMPANY	PRODUCT	NUMBER OF PINS	NUMBER OF STANDARD COLORS	GRAPHICS RESOLUTION (DOT/IN.)	LETTER/NEAR-LETTER-QUALITY SPEED (10 CHAR./IN.) (CHAR./SEC.)	DRAFT-QUALITY SPEED (10 CHAR./IN.) (CHAR./SEC.)	MAXIMUM PAPER WIDTH	NUMBER OF COPIES	NUMBER OF RESIDENT FONTS	NUMBER OF FONT CARD SLOTS	DIP SWITCH OR FRONT PANEL FONT SELECTION METHOD	RATED NOISE LEVEL	SERIAL OR PARALLEL INTERFACE	PRINTER EMULATIONS	INTERNAL BUFFER CAPACITY (STANDARD)	MEAN TIME BETWEEN FAILURES	PRINT HEAD LIFE	SHEET FEEDER OPTION	PRICE
Dennison Manufacturing Co. (617) 879-0511	Intacs series	9	1	72 x 60	NA	200 to 350	15 in.	5	—	NA	NA	40dba or less	Both	None	40K bytes	2,000 hours	200 million char.	No	$3,000-$6,000
Digitec Corp. (614) 387-3444	6000 series	7, 5	1	NA	NA	4 line/sec.	2.05 x 80 in.	0	96 ASCII	0	DIP switch	NA	Both	None	2K bytes	3 million lines	3 million lines	No	Contact vendor
Eaton Printer Products Corp. (307) 856-4821	Journal Receipt Printer	7, 9	1	—	—	—	3.875 in.	3+	96	0	DIP switch	—	Both	Centronics, IBM	200 bytes	—	100 million char.	No	$425
Epson America, Inc. (800) 421-5426	LQ-2500	24	1	60 to 360	90	270	14.3 in.	3	6	2	Front-panel	—	Both	ESC/P extended character set with IBM-style graphics	8K bytes	6,000 hours	200 million char.	Yes	$1,399
	LQ-1000	24	1	60 to 360	60	180	16 in.	3	2	2	Front-panel	—	Both	IBM 5152, Diablo 630	7K bytes	6,000 hours	200 million char.	Yes	$999
	LQ-800	24	1	60 to 360	60	180	10 in.	1	3	2	Front-panel	—	Both	IBM 5152, Diablo 630	7K bytes	4,000 hours	200 million char.	Yes	$699
	EX-1000	9	1	60 to 240	50	250	16 in.	2	3	NA	Front-panel	—	Both	IBM Proprinter	8K bytes	6,000 hours	100 million char.	Yes	$799
	EX-800	9	1	60 to 240	50	250	10 in.	2	3	NA	Front-panel	—	Both	IBM Proprinter	8K bytes	4,000 hours	100 million char.	Yes	$599
	FX-286e	9	1	60 to 240	40	200	16 in.	2	3	NA	Front-panel	—	Parallel	IBM Proprinter XL	8K bytes	6,000 hours	100 million char.	Yes	$699
Facit, Inc. (603) 424-8000	C series	9	4	216 x 240	80	250, 400	15 in.	4	3	0	Front-panel	55dba, 57 dba	Both	Facit, Epson FX series, IBM Proprinter	2K bytes	5,000 hours	200 million char.	Yes	$1,995-$2,495
	B series	9, 18, 24	4	216 x 240	200, 250	200, 250	15 in.	4	3	2	Front-panel	55dba	Both	Facit, Epson FX series, IBM Proprinter	2K bytes	4,000 hours	200 million char.	Yes	$745-$1,145
	Documate 3000	9	1	72 x 120	100	200	9.5 in.	5	3	1	Front-panel	55dba (standard), 50dba (quiet mode)	Either or both	IBM Proprinter, Facit 4528 series	6K bytes	5,000 hours	300 million char.	No	$1,495
Florida Data Corp. (305) 259-4700	Model 130	8	1	360 x 384	75, 115	600	15 in.	6	14	0	Front-panel	65db	Both	Diablo 630	2.5K bytes	5,000 hours	1 billion char.	Yes	$3,995
	Model 3000	8	1	360 x 384	75, 115	600	15 in.	6	14	0	Front-panel	65db	Both	Diablo 630	2.5K bytes	5,000 hours	1 billion char.	No	$3,795
Fujitsu America, Inc. (408) 946-8777	DX2400	9	1	60 to 240	54	270	16.5 in.	2	2	0	Front-panel	55db	Both	IBM Graphics, Proprinter, Epson FX-80, JX-80	8.7K bytes	6,000 hours	100 million char.	Yes	$845
	DX2300	9	1	60 to 240	54	270	10.5 in.	2	2	0	Front-panel	55db	Both	IBM Graphics, Proprinter, Epson FX-80, JX-80	10K bytes	6,000 hours	100 million char.	Yes	$645
	DX2200	9	1	60 to 240	44	220	16.5 in.	2	2	0	Front-panel	55db	Both	IBM Graphics, Proprinter, Epson FX-80, JX-80	8.7K bytes	6,000 hours	100 million char.	Yes	$745
	DX2100	9	1	60 to 240	44	220	10.5 in.	2	2	0	Front-panel	Less than 55db	Both	IBM Graphics, Proprinter, Epson FX-80, JX-80	10K bytes	6,000 hours	100 million char.	Yes	$545
	DL series	24	1	360 x 180	60, 80	180, 240	10½, 16.5 in.	2, 4	3, 4	1	Front-panel	55db	Both	IBM Graphics, Proprinter, Epson FX-80, JX-80, DPL 240, DP624 D, Diablo 630API	8K to 24K bytes	6,000, 8,000 hours	230 million, 300 million char.	Yes	$797-$1,695
General Business Technology, Inc. (714) 261-1891	5227FA	9	1		60	120	9 in.	4	8	0	Front-panel	58dba	IBM System/36, 38 twinaxial	IBM 5225	256 bytes	4,000 hours	200 million char.	No	$1,995
	5222DP	9	1	—	50	200	15.5 in.	4	20	0	Front-panel	—	IBM System/36, 38 twinaxial	IBM 5225	256 bytes	—	100 million char.	No	$2,495
	5220DP	18	1	—	100	400	15.5 in.	6	6	0	Front-panel	61.5dba	IBM System/36, 38 twinaxial	IBM 5225	256 bytes	2,500 hours	300 million char.	Yes	$3,995
	5210BL	9	1	—	150	150	15 in.	6	10	0	Front-panel	—	IBM System/36, 38 twinaxial	IBM 5225	256 bytes	—	—	No	$4,995
Genicom Corp. (800) 437-7468	3410 Quiet	—	1	144 x 144	—	400	15 in.	6	—	—	—	Less than 55db	—	IBM PC Graphics	—	—	—	Yes	Contact vendor
	GLP II	9	1	—	25	100	10 in.	2	2	0	DIP switch	60db	Both	Epson FX, IBM PC Graphics	3K bytes	4,000 hours	50 million char.	No	$320
	Printstation 210-220	9	1	—	45	180	13.9, 16.5 in.	2	2	3	DIP switch	53db, 55db	Both	Epson FX, IBM PC Graphics	4K bytes	4,000 hours	100 million char.	Yes	$169
Hermes Products, Inc./ Olivetti USA (201) 218-1999	PCP-3	18	1	144 x 240	100	400	17 in.	4	4	1	DIP switch	56dba, 52 dba	Both	IBM PC	256 char.	250 million char.	NA	Yes	Contact vendor
	PCP-4	18	8	144 x 240	100	400	17 in.	4	4	0	DIP switch	56dba, 52 dba	Both (twinaxial version available)	IBM PC	256 char.	250 million char.	NA	Yes	Contact vendor

COMPANY	PRODUCT	NUMBER OF PINS	NUMBER OF STANDARD COLORS	GRAPHICS RESOLUTION (DOT/IN.)	LETTER/NEAR-LETTER-QUALITY SPEED (10 CHAR./IN.) (CHAR./SEC.)	DRAFT-QUALITY SPEED (10 CHAR./IN.) (CHAR./SEC.)	MAXIMUM PAPER WIDTH	NUMBER OF COPIES	NUMBER OF RESIDENT FONTS	NUMBER OF FONT CARD SLOTS	DIP SWITCH OR FRONT PANEL FONT SELECTION METHOD	RATED NOISE LEVEL	SERIAL OR PARALLEL INTERFACE	PRINTER EMULATIONS	INTERNAL BUFFER CAPACITY (STANDARD)	MEAN TIME BETWEEN FAILURES	PRINT HEAD LIFE	SHEET FEEDER OPTION	PRICE
Hermes Products, Inc./Olivetti USA (201) 218-1999	PR 612	18	1	144 x 240	100	400	17 in.	4	4	0	DIP switch	56dba, 52 dba	Both	Epson, Centronics	256 char.	250 million char.	NA	Yes	Contact vendor
	PR 615	18	8	144 x 240	100	400	17 in.	4	4	0	DIP switch	56dba, 52 dba	Both	Epson, Centronics	256 char.	250 million char.	NA	Yes	Contact vendor
	PR 717	18	13	288 x 380	100	400	17 in.	4	8	0	Front-panel, system	56dba, 52 dba	Both	IBM PC, Color PC, IBM Proprinter, Centronics, Epson	256 char.	250 million char.	NA	Yes	Contact vendor
	PR 616	18	8	144 x 244	100	400	17 in.	4	8, 10	0	System	56dba, 52 dba	Both (twinaxial version available)	Centronics, Epson	256 char.	250 million char.	NA	Yes	Contact vendor
Mannesmann Tally Corp. (206) 251-5500	MT87/88	9	1	240 x 216	50	200	10, 16 in.	2	1	1	Front-panel	57dba	One standard	Epson FX, IBM PC, Proprinter	3K bytes	5,000 hours	100 million char.	Yes	$599-$799
	MT85/86	9	1	240 x 216	45	180	10, 16 in.	2	1	1	Front-panel	54dba	One standard	Epson FX, IBM PC	3K bytes	5,000 hours	100 million char.	No	$499-$699
	MT 290	1	1	72 x 144	50	200	19 in.	5	1	1	NA	58dba	Both	Epson FX, IBM Graphics	8K bytes	2,500 hours	200 million char.	Yes	$1,199
	MT 330	24	1	240 x 360	75, 150	300	16.5 in.	3	2	1	Both	52dba	Both	IBM Graphics, Proprinter, Diablo 630, Mannesmann Tally MT290, MT490	8K bytes	4,800 hours	400 million char.	Yes	$1,799
	MT 340	18	1	144 x 144	125	400	16.5 in.	4	2	1	Both	53dba	Both	IBM Graphics, Proprinter, Epson FX, Diablo 630	8K bytes	4,800 hours	400 million char.	Yes	$1,899
	MT 640D	9	1	84 x 160	—	270	16 in.	3	3	—	Both	55dba	Both	Mannesmann Tally MT290	8K bytes	2,000 hours	400 million char.	Yes	$2,699
	MT 490	18	1	72 x 144	150	400	16 in.	4	1	—		55dba	Both	IBM Graphics, Epson FX	8K bytes	2,000 hours	400 million char.	Yes	$2,699
MDS Qantel, Inc. (415) 887-7777	Model 5090	33 hammers	1	72 x 525	—	300 line/min	16 in.	5	2	0	Both	65db	Serial	None	256 bytes	8,000 hours	25 million char.	No	Contact vendor
	Model 4350	24	1	—	80	240	16 in.	3	2	1	Both	55dba	Both	Epson, IBM Graphics	8K bytes	6,000 hours	400 million char.	Yes	Contact vendor
Memorex Corp. (408) 987-9439	2114-1	9	1	—	55	220	16 in.	5	3	—	—	55db	—	—	4K bytes	—	200 million char.	No	Contact vendor
	2124-2E	—	—	18 x 20	80	350	16 in.	6	4	—	—	55db	—	—	—	—	—	Yes	Contact vendor
	2024	—	—	—	80	350	16 in.	—	2	—	—	—	—	—	—	—	—	Yes	Contact vendor
Modcomp (800) 322-3287	4228	—	1	—	150	440 line/min	15 in.	6	—	—	—	—	Serial	—	—	—	—	—	Contact vendor
	4856	—	1	—	150	440 line/min	15 in.	6	—	—	—	—	Serial	—	—	—	—	—	Contact vendor
NBS Southern, Inc. (813) 441-1981	M-200	14	1	NA	NA	200 line/min	16 in.	5	1	NA	NA	55db	Both	NA	2K bytes (serial), 1 line (parallel)	3,000 hours	240 million char.	No	$3,295
NEC Information Systems, Inc. (617) 264-8000	Pinwriter P8300	24	1	—	170	480	—	—	—	—	—	—	—	—	—	7,000 hours	—	—	$2,795
	Pinwriter P2200	24	1	360 x 360	55	170	80 col.	—	—	—	—	57dba	—	—	—	4,000 hours	—	Yes	$499
	Pinwriter P9XL	24	8	360 x 360	140	400	—	—	16	—	—	55dba	—	—	16K bytes	7,000 hours	—	—	$1,795
	Pinwriter P5XL	24	8	360 x 360	100	290	—	—	16	—	—	48dba, 53dba	—	—	—	—	—	—	$1,495
	Pinwriter P6-P7	24	—	—	65	216	80, 136 col.	—	—	—	—	56dba	—	—	8K bytes	—	—	—	$699-$995
	Pinwriter CP6-CP7	24	8	360 x 360	65	216	80, 136 col.	—	—	—	—	56dba	Both	—	8K bytes	—	—	—	Contact vendor
Nissho Information Systems (800) 952-1919	NP-910	9	1	72 x 240	58	350	16 in.	5	7	1	Front-panel	59db	Both	IBM Graphics, Epson FX-100+	4K bytes	6,000 hours	3 million char.	Yes	$1,445
	NP-2405	24	1	180 x 360	80	250	16 in.	5	9	1	Front-panel	55db	Both	Diablo 630, Epson LQ-1500	6K bytes	6,000 hours	2 million char.	Yes	$1,345
	NP-2410	24	1	180 x 360	150	300	16 in.	5	7	1	Front-panel	59db	Both	Diablo 630, Epson LQ-1500	6K bytes	6,000 hours	3 million char.	Yes	$1,845
North Atlantic Industries, Inc. (512) 582-6060	Model 7075	9	1	144 x 144	45, 90	180	15 in.	5	5	0	DIP switch	62dba or less	Both	DEC, Epson, Diablo	2.7K bytes	4,000 hours	500+ million char.	Yes	$1,795
	Model 7085	9	1	144 x 144	65, 125	300	15 in.	5	5	0	DIP switch	62dba or less	Both	DEC, Epson, Diablo	4.7K bytes	4,000 hours	500+ million char.	Yes	$2,395
Okidata Corp. (800) OKIDATA	Microline 192 Plus	9	1	288 x 144	40	200	10.5 in.	3	5	NA	Front-panel	57dba	Either	IBM 5152	8K bytes	4,000 hours	200 million char.	Yes	$499
	Microline 193 Plus	9	1	288 x 144	40	200	16 in.	3	5	NA	Front-panel	55dba	Either	IBM Graphics 5152	8K bytes	4,000 hours	200 million char.	Yes	$749
	Microline 292	18	14	288 x 144	100	240	10.5 in.	3	2	NA	Front-panel	57dba	Either	IBM Graphics 5152	8K bytes	4,000 hours	200 million char.	Yes	$749

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Okidata Corp. (800) OKIDATA	Microline 293	18	14	288 x 144	100	240	16 in.	3	2	NA	Front-panel	57dba	Either	IBM Graphics 5152	8K bytes	4,000 hours	200 million char.	Yes	$949
	Microline 294	18	14	288 x 144	100	400	16 in.	3	2	NA	Front-panel	57dba	Either	IBM Graphics 5152	8K bytes	4,000 hours	200 million char.	No	$1,499
Output Technology Corp. (800) 422-4850	850XL	9 pins, 3 heads	1	50 x 72 or 100 x 72	72	850	16 in.	5	2	0	Front-panel	65db or less	Both	DEC LA120, Epson FX series	8K bytes	4,000 hours	300 million char. per head	No	$2,395
	888XL	9 pins, 3 heads	1	50 x 72 or 100 x 72	72	850	16 in.	5	2	0	Front-panel	65db or less	Parallel, twinaxial	IBM 4214, 5256, 5224, 5225	8K bytes	4,000 hours	300 million char. per head	No	$3,795
	889XL	9 pins, 3 heads	1	50 x 72 or 100 x 72	72	850	16 in.	5	2	0	Front-panel	65db or less	Parallel, coax	IBM 3287, 3262	8K bytes	4,000 hours	300 million char. per head	No	$3,995
	OT-700E	9 pins, 3 heads	1	50 x 72 or 100 x 72	—	700	16 in.	5	2	0	Front-panel	65db or less	Both	Epson FX, DEC LA120	8K bytes	4,000 hours	300 million char.	No	$1,995
Hewlett-Packard Co. Contact local sales office	2932A, 2934A	12	1	90 x 90	67	200	15.75 in.	5	0	4	Front-panel	63db	Both	Diablo 630	2K bytes	3,000 hours	100 million char.	Yes	$2,595-$2,995
Honeywell Bull Italia (415) 974-4340	420-21 series	9	1	200 x 72	40	200	11, 17 in.	2	1	1	DIP switch	55db	Either	Epson, IBM Graphics	4K bytes	6,000 hours	300 million char.	Yes	From $599
	466 series	18	7	245 x 72 or 44 x 44	75	400	17.5 in.	5	2, 6, 9	2	Front-panel	55db	Both	IBM Graphics, Epson JX-80	4K bytes	8,000 hours	500 million char.	Yes	From $2,400
	466P	18	7	245 x 72 or 44 x 44	75	400	17.5 in.	5	2, 6, 9	2	Front-panel	55db	Both	HP 7475A Plotter	4K bytes	8,000 hours	500 million char.	Yes	$2,999
	466C	18	7	245 x 72 or 44 x 44	75	400	17.5 in.	5	2, 6, 9	2	Front-panel	55db	Parallel, coaxial	—	4K bytes	8,000 hours	500 million char.	Yes	$3,250
	4/62	18, 2 rows stagg-ered	7	144 x 144 or 240 x 144	120 (bi-direc-tional)	250	17.5 in.	5	2	2	Front-panel	55db	Both	IBM Graphics, Epson JX-80	4K bytes	8,000 hours	300 million char.	Yes	From $2,160
IBM Contact local authorized IBM dealer	IBM 4207 Proprinter X24	24	1	—	67 to 80	200 to 240	11 in.	—	4	—	Front-panel	—	Both	IBM	6K bytes	—	—	Yes	$799
	IBM 4201 Proprinter II Model 002	—	—	—	—	—	—	—	—	—	—	60db	—	IBM	4K bytes	—	—	—	$549
	IBM 4208 Proprinter XL24	24	1	—	67 to 80	200 to 240	16.5 in.	—	4	—	—	60db	—	IBM	6K bytes	—	—	Yes	$1,049
Infoscribe, Inc. (703) 689-2805	Model 800 Demand Document Printer	9	1	144 x 144	40	200	16.5 in.	5	4+	NA	DIP switch, host-computer program-mable	54db	Both	Centronics, Epson, IBM, Diablo 630	4K bytes	4000+ hours	500+ million char.	No	$1,795
	Model 1100	9	1	144 x 144	40	200	16.5 in.	5	4+	NA	DIP switch, host-computer program-mable	54db	Both	Centronics, Epson, IBM, Diablo 630	4K bytes	4,000+ hours	500+ million char.	Yes	$1,590
	Model 1400	18	1	144 x 144	80	400	16.5 in.	5	4+	NA	DIP switch, host-computer program-mable	54db	Both	Centronics, Epson, IBM, Diablo 630	32K bytes	4,000+ hours	500+ million char.	No	$1,845
Interface Data, Inc. (617) 938-6333	290	9	1	100	50	200	14.5 in.	4	4	1	Front-panel	55db	Both	IBM, Epson, Diablo 630	2K bytes	5,500 hours	—	Yes	$1,095
	490	9	1	100	100	400	14.5 in.	4	4	1	Front-panel	55db	Both	IBM, Epson, Diablo 630	2K bytes	5.500 hours	—	Yes	$1,795
Interface Systems, Inc. (800) 544-4072	ISI 487	9	1	100	50	200	15 in.	5	2	0	Both	62db	Parallel, IBM 3270 coaxial	IBM 3287	4K bytes	4,000 hours	—	Yes	From $3,950
	ISI 468	18	1, 7	100	100	400	15 in.	5	2	0	Both	58db	Parallel, coaxial	IBM 3287, 3268	4K bytes	4,000 hours	—	Yes	From $4,950
Lexi Computer Systems Corp. (617) 681-1118	Lexi 5214	9	NA	—	50	200	14+ in.	6	NA	NA	NA	60db	Serial twinaxial	IBM 5214, 5224	NA	5,000 hours	100 million char.	Yes	$3,650
	Lexi 5414	18	NA	NA	100	400	14+ in.	6	NA	NA	NA	60db	Parallel, serial twinaxial	IBM 5214, 5224	NA	5,000 hours	100 million char.	Yes	$4,995
	Lexi 3568	18	NA	NA	100	400	14+ in.	6	NA	NA	NA	60db	IBM serial system 3270 Coax A	IBM 3287, 3268, 4214	NA	5,000 hours	100 million char.	Yes	$4,995
	Lexi 3517	9	NA	NA	50	200	14+ in.	6	NA	NA	NA	60db	IBM serial system 3270 Coax A	IBM 3287, 4214	NA	5,000 hours	100 million char.	Yes	$3,695

SPOTLIGHT

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Lexi Computer Systems Corp. (617) 681-1118	Lexi 8850T	18	NA	NA	320	320	15+ in.	6	NA	NA	NA	Less than 55db	IBM System/36, 38	IBM 5224	NA	5,000 hours	400 million char.	No	$5,995
	Lexi 8850C	18	NA	NA	320	320	15+ in.	6	NA	NA	NA	Less than 55db	IBM serial system 3270 Coax A	IBM 3287, 4214, 3268	NA	5,000 hours	400 million char.	No	$5,995
Panasonic Industrial Co. (201) 348-7000	KX-P1080I	9	1	240 x 215	24	120	10 in.	2	12	0	Front-panel	60db	Parallel	Epson RX-80, IBM Matrix, Graphics	1K byte	4,000 hours	100 million char.	No	$4,299
	KX-P1595	9	1	240 x 216	51	240	16.5 in.	3	14	0	Front-panel	66db	Both	Epson FX-100, Diablo 630, IBM Matrix, Graphics	15K bytes	4,000 hours	100 million char.	Yes	$699
	KX-P1524	24	1	360 x 180	80	240	16.5 in.	3	18	1	Front-panel	66db	Both	IBM Proprinter, Epson LQ-1500, Diablo 630	13.5K bytes	4,000 hours	100 million char.	Yes	$899
	KX-P1092I	9	1	240 x 216	32	160	10 in.	2	14	0	Front-panel	63db	Parallel	Epson RX-80, IBM Proprinter	1K byte	4,000 hours	100 million char.	Yes	$499
	KX-P1091I	9	1	240 x 216	32	160	10 in.	2	14	0	Front-panel	63db	Parallel	Epson RX-80, IBM Proprinter	1K byte	4,000 hours	100 million char.	No	$399
	KX-P1592	9	1	240 x 216	38	180	16.5 in.	2	12	0	Front-panel	64db	Parallel	Epson FX-100, IBM Matrix, Graphics	7K bytes	4,000 hours	100 million char.	Yes	$649
Plessey Peripheral Systems, Inc. (800) 992-8744	3410, 3410Q	18	—	144 x 144	100	400	15.5 in.	5	—	—	—	55db, 65db	Both	—	512 bytes	—	—	Yes	Contact vendor
	S7024, S7024C	—	1, 4	144 x 144	60	240	16 in.	5	1	0	—	55db	Both	IBM Proprinter, Printronix P series, Anadex 9625B+	6K bytes	—	—	No	Contact vendor
	CI-4000	9	1	72 x 240	87.5	400	16 in.	5	—	—	—	58db	Both	DEC LA100, LA210, IBM Graphics, Epson FX	—	6,000 hours	—	—	Contact vendor
	3320	18	1	288 x 144	150	300	15.5 in.	5	—	—	—	55db	Both	Diablo 630, IBM Graphics	512 bytes	—	—	Yes	Contact vendor
Prime Computer, Inc. (619) 938-6333	3173F	—	1	120 x 7 or 60 x 72	240	300	16 in.	6	1	None	Both	65db	Both	—	6K bytes	4,000 hours	—	No	$8,500
	3273F	—	1	120 x 72 or 60 x 72	465	600	16 in.	6	1	0	NA	65db	Both	None	6K bytes	NA	NA	No	$10,500
Printronix, Inc. (800) 826-3874	P1031	24	1	240 x 240	47 line/min	134 line/min	80 col.	2	NA	NA	NA	57dba	Parallel	IBM Proprinter, Epson LQ-1500, Diablo 630	2K bytes	—	—	No	$895
	S7024	9	1	144 x 144	67	240	15 in.	6	8	0	—	55dba	Both	IBM Proprinter, Anadex, all Printronix	4K to 6K bytes	—	—	Yes	$1,365
	S7024C	9	4	144 x 144	67	240	15 in.	6	8	0	—	55dba	Both	IBM Proprinter, Anadex, all Printronix	4K to 6K bytes	—	—	Yes	$1,490
	MVP series	NA	1	200 x 96	80 line/min	200 line/min	16 in.	5	1	2	DIP switch	—	Both	Printronix, Epson MX series	—	—	NA	No	$3,745
	P6000 series	NA	1	120 x 144	80, 90 line/min	400, 800 line/min	16 in.	5	16	NA	DIP switch	55dba, 67dba	Both	All Printronix, Epson	—	—	NA	No	$5,800-$8,600
Sanyo Business Systems Corp. (201) 440-9300	PR 241	24	1	180 x 360	63	190	16 in.	3	9	0	Front-panel	—	Both	Epson LQ	10 bytes	—	—	No	$999
SDI (603) 654-6100	9-Pin Intra-Dot Printer	9	1	—	125	628	17 in.	5	—	—	DIP switch	Less than 60db	Both	Epson	—	3,000 to 4,000 hours	300+ million char.	Yes	$325
	16-Pin Intra-Dot Printer	16	4	—	250	1,240	17 in.	5	—	—	DIP switch	Less than 60db	Both	Epson	—	3,000 to 4,000 hours	300+ million char.	Yes	$425
	24-Pin Intra-Dot Printer	24	1	—	350	1,860	17 in.	5	—	—	DIP switch	Less than 60db	Either	Epson	—	3,000 to 4,000 hours	300+ million char.	Yes	$500
Shinwa of America, Inc. (312) 470-1600	Mr. Shinwa+	9	1	1,920 dot/line	33	135	10 in.	2	7	NA	Either	58db	Both	Epson FX, IBM Graphics	8K bytes	8 million lines	30 million char.	No	$163 per 100
	LP 1510	9	1	3,264 dot/line	27	135	15.5 in.	2	8	NA	DIP switch	57db	Either	Epson FX	8K bytes	8 million lines	30,000,000	No	$272 per 100
	VP 160	9	1	1,920 dot/line	33	160	10 in.	2	8	NA	Both	55db	Either	Epson LX, FX, IBM Graphics	8K bytes	8 million lines	30 million char.	No	$199 per 100
	VP 130	9	1	1,920 dot/line	27	135	10 in.	2	8	NA	Both	58db	Either	Epson FX, IBM Graphics	8K bytes	8 million lines	30 million lines	No	$182 per 100
	LP 1516	9	1	3,264 dot/line	33	160	15.5 in.	2	8	NA	Both	55db	Either	Epson LX, FX, IBM Graphics	8K bytes	8 million lines	30 million char.	NA	$296 per 100
Singer Data Products, Inc. (312) 860-6500	612	18	1	144	120	400	15.75 in.	4	4	4	DIP switch	56db	Both	Epson, Diablo	4K bytes	4,000 hours	400 million char.	Yes	$2,300
	615	18	8	144	120	400	15.75 in.	4	4	4	DIP switch	56db	Both	Epson, Diablo	4K bytes	4,000 hours	400 million char.	Yes	$2,500
	PC 3	18	1	144	120	400	15.75 in.	4	4	4	DIP switch	56db	Both	IBM Graphic, Epson, Diablo	4K bytes	4,000 hours	400 million char.	Yes	$2,300
	PC 4	18	8	144	120	400	15.75 in.	4	4	4	DIP switch	56db	Both	IBM Color Graphic, Epson, Diablo	4K bytes	4,000 hours	400 million char.	Yes	$2,500

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Star Micronics America, Inc. (212) 986-6770	N Series	9, 24	1	180 x 360 (24-wire)	25 to 60 or 72 to 100	100, 300	15.75 in.	2	1, 2	1, 2	Front-panel	62 dba	Parallel; serial optional	IBM Graphics, Proprinter, Epson FX	2K to 16K bytes	2,400 hours	—	Yes	$269-$1,399
Syntest Corp. (617) 481-7827	SP-2010	9	1	960	NA	130	11 in.	3	7	—	Software-selectable	63db	Both	IBM, Epson	7K bytes	100 million char.	100 million char.	No	$1,035
	SP-700	7	2	NA	NA	60	2.75 in.	3	2	—	Software-selectable	53db	Serial	None	1 line (standard), 3 lines (optional)	100 million char.	100 million char.	No	$385
	SP-311	9	1	400	NA	120	4.5 in.	5	6	—	Software-selectable	52db	Both	IBM, Epson	7K bytes	100 million char.	100 million char.	No	$835
	SP-309	7	1	NA	NA	120	Unltd. (Ticket printer)	3	1	—	NA	55db	Parallel, serial; optional	None	1.5K bytes	100 million char.	100 million char.	NA	$790
Tandy Corp./ Radio Shack (817) 390-3011	DMP-106	8	1	480 to 800 dot/line	—	80	9.5 in.	1	4	NA	DIP switch	—	Parallel	None	1 line	—	1.5 million char.	Yes	$199.95
	DMP-130	9	1	480 to 1,920 dot/line	20	100	10 in.	2	10	NA	DIP switch	—	Parallel	IBM PC compatible	1 line	—	2 million char.	Yes	$349.95
	DMP-430	18	1	480 to 800 dot/line	100	180	15 in.	2	5	NA	DIP switch	63db	Parallel	IBM PC compatible	1 line	100 million char.	100 million char.	Yes	$699
	DMP-2110	24	1	360	—	240	15 in.	2	7	NA	DIP switch	—	Parallel	IBM	1 line	—	—	Yes	$1,295
	DMP-2200	9	1	60 to 245	90	380	15 in.	6	4	NA	DIP switch	58db	Parallel	IBM	1 line	3.68 million char.	5 billion char.	Yes	$1,695
Telex Corp. (918) 627-1111	225 Line Printer	66 hammers	1	—	600 line/min	800 line/min	16 in.	5	1	—	NA	60db	IBM System/36, 38 twinaxial	IBM 5224 Model 4	4K bytes	—	—	No	$12,800
	Telex 214-XD	6	1	NA	100	400	15.5 in.	5	2	0	Front-panel	60db	IBM System/36, 38 twinaxial	IBM 4214 Model 2	4K bytes	—	15 million char.	Yes	$5,100
	387 C High-Speed Color Matrix Printer	18	4	—	140, 280	400	16 in.	5	1	—	—	62db	IBM 3270 Type A Coax	IBM 3287	4K bytes	—	—	No	$6,700
	387 High-Speed Matrix Printer	18	1	—	140, 280	400	16 in.	5	1	—	—	62db	IBM 3270 Type A Coax	IBM 3287	4K bytes	—	—	No	$6,000
	262 Line Printer	66 hammers	1	—	165 line/min	600, 800 line/min	16.5 in.	5	5	—	—	Less than 60db	IBM 3270 Type A Coax	IBM 3262-3	4K bytes	—	—	No	$13,800
Texas Instruments, Inc. (800) 527-3500	Omni 800, 850XL	9	1	144 x 144	35	150	10 in.	2	—	—	Front-panel	Less than 65db	Both	—	256 bytes	—	125 million char.	No	$599
	860XL	9	1	144 x 144	35	150	15 in.	2	—	—	Front-panel	Less than 65db	Both	—	256 bytes	—	125 million char.	Yes	$899
	865	9	1	144 x 144	35	150	16 in.	2	—	3	Front-panel	Less than 65db	Both	—	256 bytes	—	125 million char.	Yes	$999
	810 LQ	7	1	144 x 144	20	155	15 in.	—	—	—	—	Less than 65db	Both	None	256 bytes	—	7 million char.	No	$1,645
	880	9	1	144 x 144	75	300	15 in.	3	4	—	Front-panel	Less than 65db	Both	—	2K bytes	½ per year	300 million char.	—	$2,195
Toshiba America, Inc. Information Systems Division (714) 380-3000	P321SL	24	1	180 x 360	72	216	10 in.	3	5	2	Front-panel	51db, 54db	Both	IBM Graphics, Proprinter, Toshiba, Qume Sprint 11	32K bytes	—	—	Yes	$749
	P341SL	24	1	180 x 360	72	216	15 in.	3	5	2	Front-panel	51db, 54db	Both	IBM Graphics, Proprinter, Toshiba, Qume Sprint 11	32K bytes	—	—	Yes	$999
	P351C Model 2	24	7	180 x 360	100	250	15 in.	6	5	2	Both	58db	Both	IBM Color, Graphics, Qume Sprint 11	4K bytes	—	—	Yes	$1,599
	P351 Model 2	24	1	180 x 360	100	250	15 in.	6	5	2	Both	58db	Both	IBM Graphics, Qume Sprint 11	4K bytes	—	—	Yes	$1,399
Unisys Corp. (313) 972-7000	AP1351-1	18	4	168 x 84	100	400	15.8 in.	5	2	NA	NA	60db	Both	NA	4K bytes	NA	NA	Yes	$2,395
	AP1314/ AP1354	9	NA	144 x 72	40	200	9.65, 15 in.	3	2	NA	NA	56db	Both	NA	—	—	100 million char.	Yes	$645-$895
Wang Laboratories, Inc. (800) 225-4637	PM016	9	1	144 x 144	—	160	15 in.	3	1	—	—	60db	Parallel	None	0	3,000 hours	50 million char.	No	$795
	5577	18	1	120 x 120	40	192	15 in.	5	0	0	—	65db	Wang	—	64K bytes	2,000 hours	50 million char.	Yes	$5,975
	PM017	8	1	144 x 144	—	420	15 in.	4	3	—	Software-selectable	55db	Both	IX100	3K bytes	3,000 hours	200 million char.	No	$2,100
	PM019-P	18	7	120 x 120	36, 100	180	15 in.	3	8	—	Front-panel	60db	Both	Epson JX-80	3K bytes	2,500 hours	100 million char.	Yes	$1,395
Xerox Corp. (716) 423-4828	Companion 34LQ	—	3	240 x 144	60	270	15 in.	4	—	—	—	58db	Both	Diablo 630, Epson, IBM Graphics	256 char.	4,500 hours	500 million char.	Yes	$1,595

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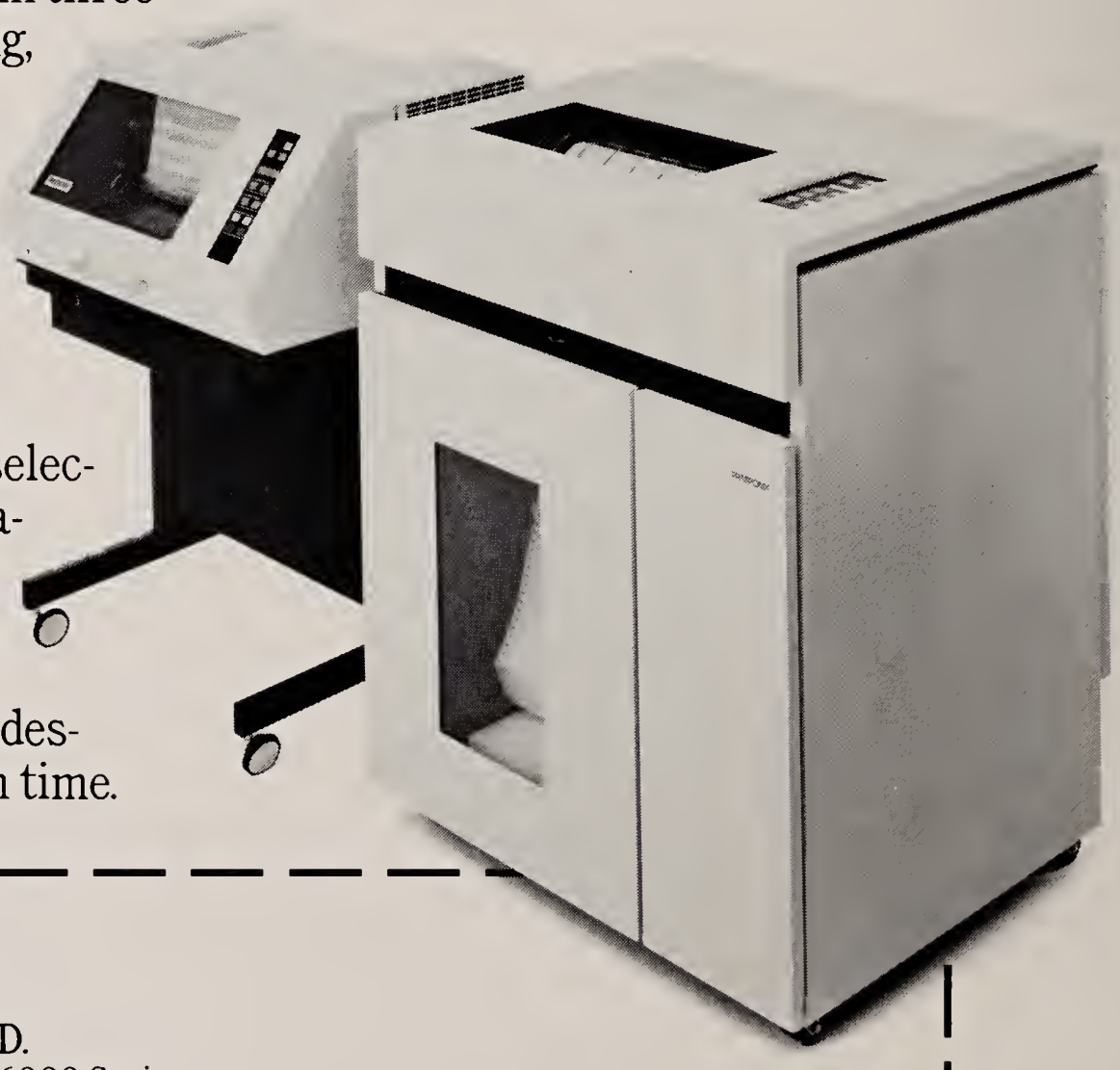

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HARD TALK

James Connolly

Old and in the way

It is common for computer vendors to scoff at and discount criticism of their product lines.

They might blame their problems on biased and uninformed writers or sour grapes on the part of incorrigibly grumpy customers. They seldom blame their own technology or service teams.

Periodically, the vendors hint that the customers are at fault for sticking with old systems when state-of-the-art, or what the company currently considers strategic, products are available. It sounds like an easy solution to say, "If you don't like the old one, try the new one." Someone in most computer companies has dropped suggestions like that at one time or another.

But numbers from Datapro Research Corp.'s annual user satisfaction surveys recently showed how serious an impact those older, "ought-to-be-upgraded" problem systems can have on a company's image. Those reports have been the subjects of articles in *Computerworld* for the last two weeks.

Continued on page 57

HP pulls ahead of mini field

System/38 notches highest satisfaction rating in Datapro user survey

BY JAMES CONNOLLY
CW STAFF

DELRAN, N.J. — Hewlett-Packard Co. broke out of a five-company pack and raced away from its competition, according to users questioned in the 1987 Datapro Research Corp. minicomputer-user satisfaction survey.

HP had been in a three-way tie for third place behind IBM and Tandem Computers, Inc. in overall user satisfaction in the 1986 survey. But this year, HP pulled away from those competitors in terms of overall satisfaction and in numerous other categories. IBM posted the best overall satisfaction score for a single computer with its System/38.

In other findings, Datapro, which is a Delran-based research firm, detected only a slight increase in the number of companies running minicomputers as departmental systems rather than as organizational hosts.

"Medium-size systems are ubiquitous as principal data processing facilities for small and mid-size businesses. Lately, however, discussions of minis focus on their role as departmental systems within larger organizations, where they function as intermediaries between desktop

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Minicomputer users
Ease of operation survey

System	*Weighted average*	*Number of responses*
Wang VS systems	3.69	297
Unisys (Burroughs) B 1900	3.68	76
IBM System/38	3.60	60
HP 3000 series	3.59	505
NCR I-9050	3.59	32
DEC VAX-11	3.58	52
IBM System/36	3.57	115
NCR 9000 ITX	3.51	201

INFORMATION PROVIDED BY DATAPRO RESEARCH CORP.

Apollo adapts to Tempest standard

BY ROSEMARY HAMILTON
CW STAFF

CHELMSFORD, Mass. — Apollo Computer, Inc. recently reported that it had completed design work for workstations based on the federal goverment standard known as Tempest.

The Tempest workstations, which are scheduled to be available within 60 days of order, are modified versions of four of the vendor's models, including the low-end personal workstation, the DN3000, and the DN580, a high-end two- and three-dimensional design system.

Two server products — the DSP90, a diskless server, and the DFS90, a dedicated file or storage server — reportedly will also be offered as Tempest products.

In addition, a Tempest version of Apollo's newest workstation, the DN590, which provides 3-D solids modeling, is under development and will be released within four months, a company spokeswoman said.

To meet the government's Nacsim 5100A specification, modifications were made to the workstations, the vendor said, including the addition of physical security features as well as structural design changes.

The TDN3000 is offered with a monochrome monitor for $21,400 or with a color monitor for $29,200. The TDN580 starts at $66,900. The TDSP90 costs $27,900, while the TDFS90 sells for $62,900.

Multi 386 CPU rates 250 MIPS

BY STANLEY GIBSON
CW STAFF

PHOENIX — Commercial Systems, Inc. announced last week what it called a supercomputer that utilizes up to 64 Intel Corp. 80386 microprocessors.

The HS-4000 is Commercial Systems' largest and most powerful computer to date, theoretically capable of performing a maximum of 250 million instructions per second, according to Commercial Systems.

Announced at the Usenix Conference here, the HS-4000 becomes the high-end member of the HS family of 80386-based computers, which use AT&T's Unix System V, Release 3 operating system. The HS series also includes the HS-1000, a 32-user machine, and the HS-2000, a 128-user machine.

The HS-4000 model consists of eight modular boxes that are assembled in two stacks of four boxes each, according to Tom

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Inside

Mini users

CONTINUED FROM PAGE 51

micros and central mainframes. . . . The 2% increase in the use of minicomputers as departmental systems reflects a slow movement toward departmental processing," said Datapro analyst Martha McFadden in her minicomputer report.

She noted that some of the increased share for departmental systems — which were being used by 13% of the respondents, compared with 11% in 1986 — can be attributed to Datapro's inclusion of supermicrocomputers in the survey for the first time this year.

However, McFadden noted that Datapro will continue to monitor the use of minicomputers and supermicros as departmental systems and will watch how minicomputer vendors compete with networked high-end personal computers, particularly those based on the Intel Corp. 80386 microprocessor.

Datapro based its findings on 2,369 mail survey responses from minicomputer users.

Most of the questions dealt with user ratings of their vendors in areas such as hardware, software and maintenance. Respondents rated vendors and systems on a four-point scale, with "1" being the poor score and "4" representing excellence.

As a company, HP posted an overall satisfaction score of 3.55, which was up from 3.46 in 1986. Of 523 HP users responding, 505 were running the HP 3000 series and gave that family an average overall satisfaction score of 3.56.

That left the HP 3000 in second place behind the System/38, which had a score of 3.58.

Datapro listed seven systems that met the company's criteria for special merit, which required a minimum of 20 responses, an overall satisfaction rating of at least 3.2 and no ratings of less than 2.8. In addition to the System/38 and HP 3000, the product families receiving special merit were the NCR Corp. Tower, Tandem's Nonstop, Digital Equipment Corp.'s VAX-11 and the IBM System/36.

"It is interesting to note that despite the criticism that has been showered on the System/36 and 38 for their incompatibility with each other and the rest of the IBM product line, users have demonstrated that they are very satisfied with the systems. In addition, despite the media's high opinion of DEC's newer VAX 8000s, these systems did not meet our special merit criteria for 1987," McFadden noted.

Another company scoring well in most categories, including an overall satisfaction rating of 3.63, was Stratus Computer, Inc. However, with only eight users responding, Stratus fell short of the 20-user minimum for special merit.

On the negative side, the Harris Corp. H series, with 23 responses, finished last in numerous categories, including overall satisfaction, in which it received a score of 2.96.

Among vendors with more than 20 responses, IBM and Tandem tied for second place in overall satisfaction with scores of 3.43.

The Wang Laboratories, Inc. VS series was rated the easiest to operate, while the Unisys Corp. B1900 was cited for the best operating system.

Strong areas for HP included reliability of the system, reliability of peripherals, maintenance response and troubleshooting.

The System/38 finished second in reliability of the system and operating system.

Configuration adequate?

Datapro also asked users whether the initial system configuration proposed by their vendor met their needs, and 84% said that configuration was adequate. More than 94% of the NCR Tower users said their configurations were adequate, while 9.5% of MAI Basic Four, Inc. users and 9% of the DEC Microvax users said their vendors had proposed configurations that proved too large. Half of the Apollo Computer, Inc. users and 28% of the DEC VAX 8600 and 8650 customers said their configurations proved too small.

The research firm spotted a trend toward minicomputer users buying software rather than having in-house personnel write it, as users ranked their means of acquiring application software. Use of in-house personnel slipped from 81% in 1986 to 76% in 1987. Use of independent suppliers rose from 48% to 53%, and use of packaged programs from manufacturers climbed from 32% to 36% between 1986 and 1987. Use of contract programmers also slipped, from 31% to 27%.

The most commonly used program-

Continued on page 56

Minicomputer users
Reliability of peripherals

System	*Weighted average*	*Number of responses*
HP 3000	3.62	505
NCR Tower	3.53	20
AT&T 3B2	3.51	52
MAI Basic Four 7000, 8000, 9000	3.50	21

INFORMATION PROVIDED BY DATAPRO RESEARCH CORP.

Users rate their minis and supermicros

Survey Item \ Manufacturer and Model	Altos Supermicros	Apollo Domain Systems	AT&T 3B2	AT&T 3B/5/15/20	Concurrent Computer Series 3200	Data General Eclipse MV/Family	Digital Equipment MicroVAX	Digital Equipment PDP-11	Digital Equipment VAX 11	Digital Equipment VAX 8000	Digital Equipment VAX 8600/8650	Harris H Series	Hewlett-Packard HP 1000 Series	Hewlett-Packard HP 3000 Series	Honeywell DPS 6	IBM System/36
No. of User Responses	10	8	52	12	25	238	12	23	52	9	7	23	18	505	49	115
Average Life of System (months)	14.50	28.00	16.73	16.00	42.50	33.18	13.25	52.16	35.37	10.56	16.71	46.82	55.00	33.94	31.36	28.67
Acquisition Method (%)																
Purchase	90.00	50.00	86.54	83.33	96.00	78.57	75.00	100.00	76.92	55.56	85.71	82.61	88.89	69.90	73.47	68.70
Rental or Lease from Manufacturer	0.00	25.00	3.85	0.00	0.00	4.62	0.00	0.00	3.85	0.00	14.29	4.35	5.56	20.20	6.12	15.65
Lease from Third Party	10.00	25.00	5.77	16.67	4.00	15.13	25.00	0.00	15.38	44.44	0.00	4.35	5.56	9.11	18.37	14.78
System Ratings (4.0-1.0)																
Ease of Operation	3.30	3.63	3.14	3.50	3.04	3.42	3.33	3.23	3.58	3.44	3.43	3.09	3.18	3.59	3.21	3.57
Reliability of System	3.40	3.38	3.46	3.42	3.56	3.62	3.45	3.70	3.67	3.33	3.71	3.17	3.76	3.84	3.47	3.80
Reliability of Peripherals	3.30	3.25	3.51	3.36	3.09	3.39	3.33	3.24	3.20	3.22	3.14	2.83	3.41	3.62	3.40	3.48
Manufacturer's Maintenance Service:																
Responsiveness	2.67	3.38	3.41	3.50	3.32	3.41	3.36	3.65	3.41	3.56	3.29	3.05	3.59	3.62	3.53	3.38
Effectiveness	3.00	3.38	3.44	3.20	3.17	3.33	3.18	3.35	3.37	3.38	3.14	2.95	3.65	3.61	3.50	3.35
Manufacturer's Technical Support.																
Troubleshooting	2.50	3.50	3.23	3.25	3.04	3.03	2.80	3.27	3.20	3.33	3.14	3.00	3.06	3.38	3.13	2.98
Education	2.20	3.13	2.84	2.91	2.85	2.90	2.80	3.00	3.22	3.44	3.29	2.91	3.12	3.14	2.78	2.96
Documentation	2.40	3.00	2.71	2.67	2.30	2.77	2.90	2.77	3.08	3.22	3.71	2.30	2.76	2.97	2.76	3.07
Manufacturer's Software:																
Operating System	3.44	3.38	3.33	3.83	2.88	3.30	3.50	3.13	3.63	3.56	3.71	2.96	3.29	3.51	3.35	3.41
Compilers & Assemblers	3.11	3.13	3.18	3.36	3.21	3.14	3.33	3.10	3.43	3.44	3.86	2.91	3.35	3.36	3.40	3.39
Applications Programs	3.43	3.13	2.80	3.25	2.52	2.91	3.09	2.95	3.14	3.22	3.67	2.48	2.93	3.04	2.84	3.14
Ease of Programming	3.20	3.25	3.08	3.09	2.92	3.21	3.17	3.05	3.39	3.33	3.50	2.86	3.00	3.33	3.16	3.17
Ease of Conversion	2.80	3.29	2.98	3.30	2.83	3.12	3.08	2.68	3.33	3.00	3.29	2.65	2.76	3.27	3.02	3.08
Overall Satisfaction	3.20	3.38	3.15	3.27	3.08	3.28	3.33	3.09	3.40	3.44	3.43	2.96	3.33	3.56	3.33	3.36
Additional Ratings (4.0-1.0)																
Timeliness of Hardware Installation	3.30	3.13	3.00	3.25	3.24	3.43	3.17	3.20	3.14	3.44	3.29	3.18	3.41	3.57	3.22	3.30
Timeliness of Software Installation	3.30	3.38	3.06	3.33	3.04	3.24	3.00	3.05	3.25	3.22	3.14	3.05	3.35	3.45	3.10	3.23
Ease of Expansion	3.20	3.38	3.22	3.17	3.17	3.39	3.17	3.00	3.31	3.56	3.29	2.70	2.94	3.58	3.46	3.32
Compatibility of Hardware Carried Over from Other Systems	3.30	3.25	3.15	3.50	2.83	2.93	3.17	3.05	3.21	3.22	3.00	2.50	2.59	3.05	3.00	3.08
Compatibility of Programs/Data Carried Over from Other Systems	2.80	3.38	3.09	2.80	2.87	2.96	2.82	2.53	3.04	3.22	3.14	2.36	2.56	3.07	2.88	2.94
Power/Energy Efficiency	3.20	3.50	3.21	3.40	2.95	3.14	3.25	2.62	2.84	3.22	3.33	2.74	3.06	3.26	3.26	3.14
Productivity Aids Help Keep Programming Costs Low	2.80	2.75	2.87	3.00	2.57	2.71	2.91	2.37	2.98	3.22	3.00	2.29	2.63	3.04	2.80	3.03
Software Support Delivered by Vendor	2.80	3.25	2.98	2.73	2.81	2.75	2.92	2.60	3.06	3.11	3.29	2.48	2.93	3.15	2.85	2.97
Keeping Up with & Implementing Vendor Changes to Hardware/Software (Very Easy=4.0: Very Difficult=1.0)	3.10	3.25	3.00	3.27	2.83	3.02	2.83	2.83	3.04	3.00	3.43	2.70	2.83	3.23	3.04	3.03
Did the system do what you expected it to do? (%)																
Yes	70.00	87.50	92.31	91.67	100.00	95.80	91.67	95.65	90.38	66.67	85.71	78.26	94.44	96.83	83.67	95.65
No	20.00	0.00	3.85	8.33	0.00	1.26	0.00	4.35	0.00	0.00	0.00	0.00	0.00	0.99	6.12	2.61
Undecided	10.00	12.50	3.85	0.00	0.00	2.52	8.33	0.00	0.00	11.11	14.29	21.74	5.56	1.19	10.20	1.74
Would you recommend system to another user? (%)																
Yes	70.00	75.00	73.08	83.33	72.00	83.19	91.67	73.91	78.85	77.78	85.71	43.48	94.44	95.25	79.59	96.52
No	20.00	0.00	15.38	0.00	8.00	7.14	0.00	13.04	5.77	0.00	0.00	26.09	0.00	1.39	10.20	0.87
Undecided	10.00	25.00	11.54	8.33	20.00	8.82	8.33	13.04	3.85	0.00	14.29	30.43	5.56	2.77	10.20	2.61

Users rate their minis and supermicros

Survey Item \ Manufacturer and Model	IBM System/38	MAI Basic Four 7000, 8000, 9000	NCR Tower	NCR 9000 ITX	NCR I-9050	Plexus P/Series	Prime 50 Series	Stratus/32	Tandem NonStop	Unisys (Burroughs) XE500	Unisys (Burroughs) B 1900	Unisys (Sperry) Series 5000	Unisys (Sperry) System 80	Wang VS Systems	Other Supermicrocomputers	Other Minicomputers
No. of User Responses	60	21	20	201	32	15	257	8	52	17	76	18	94	297	9	34
Average Life of System (months)	48.56	35.74	16.76	30.38	38.56	22.23	26.52	21.71	41.20	21.47	40.04	15.24	40.91	30.66	17.75	47.21
Acquisition Method (%)																
Purchase	70.00	80.95	85.00	69.15	81.52	73.33	68.87	75.00	80.77	70.59	75.00	66.67	42.55	73.06	100.00	76.47
Rental or Lease from Manufacturer	11.67	9.52	10.00	17.91	6.25	6.67	20.23	0.00	3.85	17.65	13.16	5.56	36.17	12.12	0.00	11.76
Lease from Third Party	18.33	9.52	5.00	11.94	12.50	20.00	10.89	25.00	13.46	5.88	11.84	27.78	21.28	14.14	0.00	11.76
System Ratings (4.0-1.0)																
Ease of Operation	3.60	3.33	3.35	3.51	3.59	3.47	3.40	3.50	3.39	3.18	3.68	3.12	3.17	3.69	3.33	3.09
Reliability of System	3.82	3.43	3.68	3.74	3.69	3.54	3.55	4.00	3.77	3.06	3.64	3.33	3.54	3.61	2.71	3.56
Reliability of Peripherals	3.37	3.50	3.53	3.31	3.44	3.47	3.19	3.43	3.28	3.35	3.18	3.33	3.13	3.25	2.75	3.12
Manufacturer's Maintenance Service																
Responsiveness	3.59	3.52	3.53	3.48	3.42	3.47	3.44	3.63	3.39	3.65	3.44	3.56	3.19	3.03	2.56	3.24
Effectiveness	3.60	3.35	3.41	3.41	3.23	3.13	3.35	3.75	3.26	3.31	3.21	3.46	3.12	2.99	2.56	3.19
Manufacturer's Technical Support																
Troubleshooting	3.14	2.81	3.15	3.17	3.03	3.13	2.99	3.38	3.00	3.00	3.09	2.71	2.82	2.60	2.56	2.88
Education	3.00	2.62	2.84	2.95	2.97	3.00	2.91	3.63	3.06	2.79	2.99	2.44	2.54	2.55	2.38	2.68
Documentation	3.02	2.38	2.82	2.65	2.78	2.80	2.61	3.13	3.12	2.50	2.78	2.22	2.33	2.38	2.44	2.45
Manufacturer's Software																
Operating System	3.64	3.05	3.35	3.28	3.55	3.47	3.37	3.75	3.43	3.18	3.67	2.94	3.17	3.19	2.78	3.09
Compilers & Assemblers	3.53	3.12	3.29	3.29	3.42	3.27	3.13	3.63	3.29	3.06	3.42	2.76	3.18	3.25	2.67	3.00
Applications Programs	3.07	2.65	3.06	2.87	2.93	3.08	2.95	3.29	2.90	2.93	2.66	3.06	2.48	3.01	2.86	2.78
Ease of Programming	3.58	3.22	3.35	3.18	3.34	3.33	3.29	3.50	2.98	3.00	3.49	3.06	3.00	3.49	2.88	3.00
Ease of Conversion	2.93	3.00	3.21	3.18	3.32	3.00	3.20	3.29	2.90	2.71	3.17	3.00	2.89	3.21	2.67	3.00
Overall Satisfaction	3.58	3.05	3.45	3.34	3.34	3.33	3.31	3.63	3.43	3.18	3.43	3.06	3.13	3.25	2.78	3.00
Additional Ratings (4.0-1.0)																
Timeliness of Hardware Installation	3.52	3.14	3.42	3.38	3.41	3.38	3.45	3.75	3.60	3.06	3.20	3.33	3.13	3.13	3.22	3.18
Timeliness of Software Installation	3.48	2.86	3.32	3.19	3.31	3.46	3.31	3.88	3.44	2.81	3.12	3.17	3.04	3.00	3.22	3.09
Ease of Expansion	3.47	3.38	3.63	3.50	3.48	3.46	3.45	3.63	3.65	3.25	3.12	3.17	3.10	3.45	3.11	2.97
Compatibility of Hardware Carried Over from Other Systems	2.84	2.79	3.16	3.19	3.31	3.36	3.25	3.13	2.73	2.33	3.10	3.23	2.81	2.53	3.13	2.62
Compatibility of Programs/Data Carried Over from Other Systems	2.67	2.65	3.35	3.16	3.39	3.21	2.92	3.13	2.39	2.36	3.18	2.64	3.05	2.71	2.57	2.55
Power/Energy Efficiency	3.07	3.00	3.47	3.30	3.03	3.33	3.13	3.25	3.02	3.19	3.06	3.24	2.88	3.08	3.00	2.78
Productivity Aids Help Keep Programming Costs Low	3.37	2.39	2.89	2.81	2.90	2.77	2.90	3.43	2.79	2.93	2.96	2.56	2.54	3.24	3.00	2.33
Software Support Delivered by Vendor	3.10	2.40	3.00	2.97	2.79	3.07	2.85	3.63	2.92	2.75	2.86	2.61	2.55	2.54	2.50	2.23
Keeping Up with & Implementing Vendor Changes to Hardware/Software (Very Easy 4.0, Very Difficult 1.0)	3.22	3.00	3.15	3.02	3.09	3.07	3.06	3.75	3.19	2.94	3.05	2.72	2.89	2.93	2.78	3.13
Did the system do what you expected it to do? (%)																
Yes	96.66	85.71	90.00	89.55	87.50	100.00	90.66	100.00	98.08	70.59	97.37	66.67	87.23	92.26	77.78	85.29
No	1.67	9.52	10.00	4.48	9.38	0.00	3.50	0.00	1.92	17.65	1.32	16.67	7.45	2.36	0.00	5.88
Undecided	1.67	4.76	0.00	4.98	3.13	0.00	5.84	0.00	0.00	11.76	1.32	16.67	3.19	5.05	22.22	8.82
Would you recommend system to another user? (%)																
Yes	96.66	66.67	90.00	91.54	81.25	93.33	89.88	100.00	94.23	76.47	89.47	72.22	85.11	87.21	55.56	64.71
No	1.67	23.81	0.00	2.49	12.50	6.67	6.23	0.00	1.92	11.76	5.26	5.56	8.51	4.04	33.33	14.71
Undecided	1.67	9.52	10.00	5.47	6.25	0.00	3.89	0.00	3.85	11.76	5.26	22.22	6.38	8.42	11.11	20.58

Vendors rate their minis and supermicros

Survey Item \ Manufacturer and Model	Altos	Apollo	AT&T	Concurrent Computer (Perkin Elmer)	Data General	Digital Equipment	Harris Corp.	Hewlett-Packard	Honeywell	IBM	MAI Basic Four	NCR	Plexus	Prime	Stratus Computer	Tandem	Unisys	Wang Laboratories	Other Supermicrocomputers	Other Minicomputers
No. of User Responses	10	8	64	25	238	103	23	523	49	175	21	253	15	257	8	52	205	297	9	34
Average Life of System (months)	14 50	28 00	16 59	42 50	33 18	32 24	46 82	34 64	31 36	35 34	35 74	30 50	22 23	26 52	21 71	41 20	36 71	30 66	17 75	47 21
Acquisition Method (%)																				
Purchase	90 00	50 00	85 94	96 00	78 57	80 58	82 61	70 55	73 47	69 14	80 95	71 94	73 33	68 87	75 00	80 77	59 02	73 06	100 00	76 47
Rental or Lease from Manufacturer	0 00	25 00	3 13	0 00	4 62	2 91	4 35	19 69	6 12	14 29	9 52	15 81	6 67	20 23	0 00	3 85	23 41	12 12	0 00	11 76
Lease from Third Party	10 00	25 00	7 81	4 00	15 13	14 56	4 35	8 99	18 37	16 00	9 52	11 46	20 00	10 89	25 00	13 46	17 07	14 14	0 00	11 76
System Ratings (4.0-1.0)																				
Ease of Operation	3 30	3 63	3 21	3 04	3 42	3 45	3 09	3 58	3 21	3 58	3 33	3 51	3 47	3 40	3 50	3 39	3 36	3 69	3 33	3 09
Reliability of System	3 40	3 38	3 45	3 56	3 62	3 63	3 17	3 84	3 47	3 80	3 43	3 73	3 54	3 55	4 00	3 77	3 52	3 61	2 71	3 56
Reliability of Peripherals	3 30	3 25	3 48	3 09	3 39	3 22	2 83	3 62	3 40	3 44	3 50	3 35	3 47	3 19	3 43	3 28	3 19	3 25	2 75	3 12
Manufacturer's Maintenance Service																				
Responsiveness	2 67	3 38	3 42	3 32	3 41	3 46	3 05	3 62	3 53	3 45	3 52	3 48	3 47	3 44	3 63	3 39	3 35	3 03	2 56	3 24
Effectiveness	3 00	3 38	3 40	3 17	3 33	3 33	2 95	3 61	3 50	3 44	3 35	3 38	3 13	3 35	3 75	3 26	3 19	2 99	2 56	3 19
Manufacturer's Technical Support																				
Troubleshooting	2 50	3 50	3 23	3 04	3 03	3 18	3 00	3 37	3 13	3 04	2 81	3 15	3 13	2 99	3 38	3 00	2 93	2 60	2 56	2 88
Education	2 20	3 13	2 85	2 85	2 90	3 15	2 91	3 14	2 78	2 98	2 62	2 94	3 00	2 91	3 63	3 06	2 71	2 55	2 38	2 68
Documentation	2 40	3 00	2 70	2 30	2 77	3 05	2 30	2 97	2 76	3 05	2 38	2 68	2 80	2 61	3 13	3 12	2 50	2 38	2 44	2 45
Manufacturer's Software																				
Operating System	3 44	3 38	3 43	2 88	3 30	3 50	2 96	3 50	3 35	3 49	3 05	3 32	3 47	3 37	3 75	3 43	3 34	3 19	2 78	3 09
Compilers & Assemblers	3 11	3 13	3 21	3 21	3 14	3 38	2 91	3 36	3 40	3 44	3 12	3 31	3 27	3 13	3 63	3 29	3 22	3 25	2 67	3 00
Applications Programs	3 43	3 13	2 87	2 52	2 91	3 14	2 48	3 04	2 84	3 12	2 65	2 89	3 08	2 95	3 29	2 90	2 63	3 01	2 86	2 78
Ease of Programming	3 20	3 25	3 08	2 92	3 21	3 29	2 86	3 32	3 16	3 32	3 22	3 22	3 33	3 29	3 50	2 98	3 18	3 49	2 88	3 00
Ease of Conversion	2 80	3 29	3 04	2 83	3 12	3 14	2 65	3 26	3 02	3 02	3 00	3 20	3 00	3 20	3 29	2 90	2 99	3 21	2 67	3 00
Overall Satisfaction	3 20	3 38	3 17	3 08	3 28	3 33	2 96	3 55	3 33	3 43	3 05	3 35	3 33	3 31	3 63	3 43	3 24	3 25	2 78	3 00
Additional Ratings (4.0-1.0)																				
Timeliness of Hardware Installation	3 30	3 13	3 05	3 24	3 43	3 19	3 18	3 56	3 22	3 38	3 14	3 39	3 38	3 45	3 75	3 60	3 17	3 13	3 22	3 18
Timeliness of Software Installation	3 30	3 38	3 11	3 04	3 24	3 17	3 05	3 44	3 10	3 32	2 86	3 22	3 46	3 31	3 88	3 44	3 07	3 00	3 22	3 09
Ease of Expansion	3 20	3 38	3 21	3 17	3 39	3 25	2 70	3 55	3 46	3 38	3 38	3 51	3 46	3 45	3 63	3 65	3 12	3 45	3 11	2 97
Compatibility of Hardware Carried Over from Other Systems	3 30	3 25	3 22	2 83	2 93	3 15	2 50	3 04	3 00	3 00	2 79	3 20	3 36	3 25	3 13	2 73	2 91	2 53	3 13	2 62
Compatibility of Programs/Data Carried Over from Other Systems	2 80	3 38	3 04	2 87	2 96	2 94	2 36	3 06	2 88	2 85	2 65	3 21	3 21	2 92	3 13	2 39	3 01	2 71	2 57	2 55
Power/Energy Efficiency	3 20	3 50	3 25	2 95	3 14	2 91	2 74	3 25	3 26	3 11	3 00	3 28	3 33	3 13	3 25	3 02	3 00	3 08	3 00	2 78
Productivity Aids Help Keep Programming Costs Low	2 80	2 75	2 89	2 57	2 71	2 87	2 29	3 03	2 80	3 15	2 39	2 83	2 77	2 90	3 43	2 79	2 72	3 24	3 00	2 33
Software Support Delivered by Vendor	2 80	3 25	2 93	2 81	2 75	2 97	2 48	3 15	2 85	3 02	2 40	2 95	3 07	2 85	3 63	2 92	2 69	2 54	2 50	2 23
Keeping Up with & Implementing Vendor Changes to Hardware/Software (Very Easy=4.0, Very Difficult=1 0)	3 10	3 25	3 05	2 83	3 02	2 99	2 70	3 21	3 04	3 09	3 00	3 04	3 07	3 06	3 75	3 19	2 94	2 93	2 78	3 13
Did the system do what you expected it to do? (%)																				
Yes	70.00	87.50	92 19	100.00	95.80	89 32	78.26	96 75	83 67	96 00	85 71	89.33	100 00	90 66	100.00	98 08	87.80	92 26	77 78	85.29
No	20.00	0 00	4.69	0.00	1 26	0 97	0.00	0.96	6 12	2 29	9 52	5 53	0.00	3 50	0.00	1 92	6.83	2 36	0 00	5 88
Undecided	10.00	12.50	3 13	0 00	2.52	2.91	21.74	1.34	10 20	1 71	4 76	4.35	0.00	5 84	0.00	0 00	4.39	5 05	22.22	8 82
Would you recommend system to another user? (%)																				
Yes	70.00	75.00	75.00	72 00	83.19	79.61	43.48	95 22	79 59	96 57	66 67	90 12	93 33	89 88	100 00	94 23	84.88	87 21	55.56	64 71
No	20.00	0.00	12.50	8.00	7.14	5 83	26.09	1.34	10 20	1 14	23 81	3.56	6.67	6 23	0 00	1 92	7.32	4 04	33 33	14 71
Undecided	10.00	25.00	10.94	20.00	8.82	6 80	30 43	2.87	10 20	2 29	9 52	5 93	0.00	3 89	0 00	3 85	7.80	8 42	11 11	20 58

Multi 386

FROM PAGE 51

Small, Commercial Systems' sales director.

A version using 16 80386 chips is priced at $300,000. Adding 16 CPU increments raises the price to $1 million for a 64-CPU version, the vendor said. Those prices include disk storage and I/O requirements, but do not include the price of terminals and printers.

Although the system is scheduled to be available in the first quarter of 1988, the full 64-chip machine has yet to be assembled and run, according to Small. He said, however, that the architecture was designed so that a user sees no difference, except for speed, in a machine running one CPU or many.

In addition, CSI claimed the HS-4000 can be linked to other HS-4000s or other HS series machines. According to Small, the channel architecture assures compatibility between all HS series machines. The new machine offers 1G byte of random-access memory, 40G bytes of internal-disk storage, more than 1,000 serial ports and more than 60 parallel ports. It can support up to 1,000 concurrent users and has a peak disk-transfer rate of 128M byte/sec., he said.

Commercial Systems said it is aiming the new machines at business and governmental departments requiring user-intensive data processing. Commercial Systems sells its products primarily through value-added resellers.

Mini users

FROM PAGE 52

ming language was Cobol (52.7%), followed by Basic (12.3%) and RPG (9.9%).

Datapro also cited trends such as the popularity of laser printers, which 28% of the users said they plan to acquire this year, and a relative lack of interest in Unix and optical-disk storage. Only 5% of the users surveyed said they intend to add Unix this year, although Datapro noted that many of the supermicros included in the research are purchased with Unix or a Unix derivative.

Whereas 2% of the users said they planned to add optical disks in 1986, the total rose to only 4% this year. In breaking down the mini and supermicrocomputer user base, Datapro found that manufacturers are the leading users of minis, with about 23% of the systems.

Minicomputer user survey

Programming languages

Cobol	52.76%
Basic	12.29%
RPG	9.98%
Fortran	9.64%
C	3.21%
Assembler	1.46%
Pascal	0.99%
PL/1	0.90%
APL	0.09%
Other	8.69%

INFORMATION FROM A DATAPRO RESEARCH CORP. SURVEY OF 2,369 USERS

Terminal ties to dual hosts

IRVINE, Calif. — Adding to its family of Digital Equipment Corp.-compatible alphanumeric terminals, CIE Terminals, Inc. has introduced a terminal designed for simultaneous connection to two hosts.

The CIT310, which costs $749, was designed for dual-session operation with on-line switching between hosts.

According to the company, it essentially consists of two CIE CIT224 terminals with switching handled by the Mode/Session key. The vendor said the terminal uses two cables to connect to two hosts and that no special software is required for the host.

The company also cut the price of the 512K-byte model of its LIPS 10 Plus laser printer by 14% to $2,995. The printer, which emulates the Hewlett-Packard Co. Laserjet Plus printer, is scheduled to begin shipments this month.

In the way

FROM PAGE 51

What the numbers illustrate is that an older system, or even a weak new system, hurts a vendor's image in the user community by nullifying the gains of a star product. In some cases, the number of users running low-scoring systems equaled the users running high-scoring products from the same vendors. One conclusion to be drawn, albeit an unscientific one, is that half of those company's customers are unhappy. Those vendors should be warned that in addition to offering new and better solutions for the leading-edge customers, they have some fence-mending to do with a good portion of their customer base.

For example, Unisys Corp., which scored consistently higher customer satisfaction numbers from 1984 to 1986 (when it was Burroughs Corp.), saw its overall satisfaction score drop this year with the addition of some of the machines it inherited from Sperry Corp. and when some of its own older machines scored poorly.

A handful of customers gave good ratings to the Unisys A 15 mainframe, which is the high-end product from the Burroughs side of Unisys, and to the Unisys 1100/90, which was the high-end of the Sperry line.

Roughly the same number of customers gave relatively poor ratings to the Unisys B7900, which came from Burroughs, and the 1100/60, which came from Sperry. Whatever positive impact the 15 users of A 15s and 1100/90s may have had on the overall ratings by Unisys mainframe customers was nullified by the negative results.

The A 15 and 1100/90 combined for a score of 3.35 on a four-point scale with four points representing excellence. But that score fell to 3.09 when the 2.8 average of the B7900 and 1100/60 was added. The 1100/60 was one of the oldest mainframes in the Datapro report.

Complaints sour praise

What Unisys must remember is that whatever praise users may be voicing for the A 15 or 1100/90 in their own companies, at users group meetings or in the trade press may be offset by the complaints of the B7900 and 1100/60 users.

Similar comparisons could be drawn for most other vendors. Honeywell Bull, Inc. could point to the 3.58 score of its DPS 7, but saw its overall corporate ranking drawn down by a 3.16 score for the DPS 8.

IBM's System/38 led the minicomputer field with a 3.58 rating by 60 customers. But 185 customers gave the 4361 — a machine IBM apparently would rather not discuss since the introduction of the 9370 last year — a score of 3.12.

All of this does not mean that companies should devote all of their attention to pleasing customers who stay with old machines. It is just one sign that those users should not be forgotten.

Connolly is *Computerworld's* senior editor, systems & peripherals.

System/38 memory module available

HORSHAM, Pa. — Decision Data Computer Corp., a supplier of peripherals for the IBM System/36 and 38 market, has announced a 4M-byte memory module for the System/38 and lifetime warranties for that module and other memory products.

The 4M-byte product is part of Decision Data's Xtender/38 family and was designed to be installed in a System/38 without modification to the CPU, power supply or operating system. Other products covered by the lifetime warranty are the 1M- and 2M-byte Xtender/38 modules.

The modules are said to feature an off-line switch for isolation of a memory module from the system and full-board diagnostics with LED indicators signaling on/off line, memory usage and card insertion.

The 4M-byte module costs $15,500 and is available immediately, Decision Data said.

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NEW PRODUCTS

Turnkey systems

A **turnkey, entry-level manufacturing system** composed of Prime Computer, Inc. hardware and CSC Compufact, Inc.'s Man-Fact II financial/MRP II software has been announced by **CSC Compufact**.

The system includes Prime's Model 2350 hardware with 258M bytes of disk storage and 4M bytes of random-access memory.

It costs $80,000, or $4,000 per month. Additional terminals may be rented for $250 per month.

CSC Compufact, Suite 200, 7441 Lincoln Way, Garden Grove, Calif. 92641.

Processors

Heurikon Corp. has announced the **Scalos/07** 32-bit Unix-based system for Multibus I users.

Designed for software development and end-user applications, the Scalos/07 features up to 190M bytes of Winchester disk drive and a 60M-byte streaming tape drive.

The Scalos/07 is priced from $11,895 with a 55M-byte hard disk and five-slot card cage.

Heurikon, 3201 Latham Drive, Madison, Wis. 53713.

CAD/CAM/CAE

Hewlett-Packard Co. has added the entry-level **Model 318M**, a monochromatic workstation for use in design work or software development as part of an engineering work group, to its HP 9000 series of computers.

The Model 318M features a Motorola, Inc. 68881 floating-point coprocessor and 4M bytes of synchronous random-access memory.

The base HP 9000 Model 318M system costs $7,800 without a disk drive. With an 80M-byte disk and 60M-byte cartridge tape drive, it costs $14,550.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Graphics systems

A three-dimensional software visualization tool, **Visedge**, designed for the interpretation and presentation of existing and newly created data, has been announced by **Raster Technologies, Inc.**

Visedge offers a set of modeling primitives and a user interface management system that allows the user to add or delete specific capabilities.

A turnkey system including a graphics tablet, control box and the Visedge software costs $50,000.

Raster Technologies, Two Robbins Road, Westford, Mass. 01886.

Data storage

A 472M-byte removable-pack disk drive called the **T472** has been announced by **Century Data Systems, Inc.**

The drive operates at a transfer rate of 1.8M byte/sec. with an average access time of 26 msec.

The T472 is priced at $12,400.

Century Data Systems, P.O. Box 3056, Anaheim, Calif. 92803.

Printers/Plotters

NCR Corp. has introduced its **NCR 4300 CAD/COM** plotter.

The NCR 4300 was designed to output aperture cards directly from computer-aided design systems. Its laser addresses 6,000 dot/in. across the film.

The NCR 4300 is priced from $38,000 to $48,000, depending on configuration.

NCR, Micrographic Systems Division, 520 Logue Ave., Mountain View, Calif. 94043.

The backlog stops here

Development centers may do more for applications developers than CASE ever will

BY VAUGHAN MERLYN

In the last few years, a range of technologies has emerged aimed at supporting the application development process — technologies that allow new systems engineering life cycles and information resource management methodologies to be applied to development. The challenge for MIS lies in getting these techniques and technologies into routine use.

Unless effort is applied to make productivity-improvement technology work, both the technology and the improvement attempt are likely to fail in the long term. The development center concept is specifically designed to direct and apply this effort.

The development center serves the critical and special computing requirements of the application software professional. It can be viewed as the DP department for development and maintenance groups. Just as the industrial revolution depended on the factory organization concept for the productive application of powerful new machines, so, too, does the software development revolution depend on organizational concepts. The development center is the focus of that organizational change.

I estimate that fewer than 10% of all mainframe-based MIS organizations currently have a development center established. However, many more are in the planning stages, and this number will approach 50% by the end of the decade.

Not an information center

The development center is closely related to the information center: Both are agents for the transfer of technology to solve business problems. The major difference is one of audience. The information center serves the end-user community; the development center serves the MIS professional.

This end user/professional split creates some interesting dilemmas. For example, sometimes it is not clear at the outset of a project what will be professionally developed and what will be left to end users to develop. Some projects — a simple query or report, for example — begin as ad hoc, one-off personal applications and somehow grow into regularly scheduled production applications with departmental or enterprisewide implications. If simply treated as an end-user application, the system might not have the industrial strength that is required of production systems.

To address this dilemma, the development and information centers must be considered together. They must work together and recognize that they share the same goals and responsibilities. In fact, in some situations the development center and information center are folded into one organization.

The responsibility of the joint organization is the transfer of new information management and delivery technology into the enterprise. This structure recognizes that the split between end user and professional developer is somewhat vague, arbitrary and in a decided state of flux. There are novice and casual end users as well as sophisticated users capable of productively using powerful development technology. Similarly, there is a spectrum of development professionals, each with varying skills and expertise.

A range of application classes also exists, from casual, personal and ad hoc queries and reports, through departmental applications, to sophisticated enterprise systems with complex integrity constraints and demanding performance requirements. Often, applications cross from one class into another as end-user requirements evolve.

The dual-center strategy addresses this shifting spectrum of application requirements and potential development resources. It provides a unifying force and control channel to guide the application of new development technologies and increasingly involve developers — the ultimate end users — as an important piece of the information delivery solution.

CHRIS DEMAREST

Beyond pure technology

Recognizing the importance of development productivity and the need to get beyond the purely technological aspects of productivity improvement, IBM began marketing the development center concept in 1982.

Originating within IBM Canada — the birthplace of the closely related information center concept — the development center is largely an organizational approach to improving application development productivity. It acts as the technology transfer channel for new software production approaches. It provides an optimum balance among development hardware resources, development software and capable people to define, implement and support this technology.

The development center is formally defined by IBM as "a means to improve the productivity of the information systems professional by treating the development process itself as an important application."

MIS has paid less attention to the development center concept than to the information center for a number of reasons. Not the least of these reasons is that IBM, as an industry leader, offers an arsenal of tools in the

Merlyn is president of Merlyn Consulting in Marietta, Ga., a firm specializing in application development automation.

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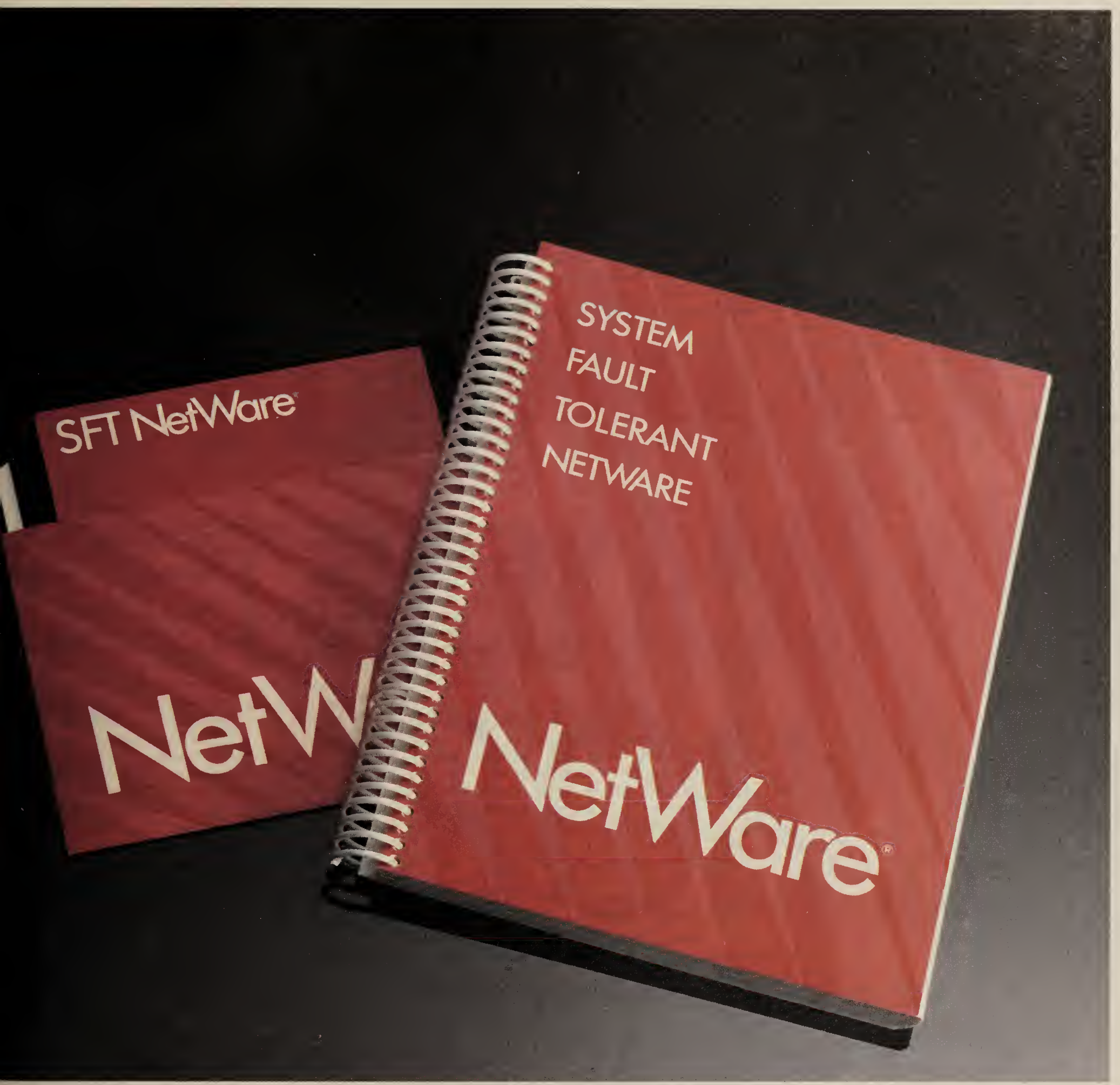

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information center area and few good tools for development centers. Furthermore, the end-user market accessed through the information center is far more lucrative for IBM than the internal MIS market.

But current discussions of computer-aided software engineering (CASE) tools force the development center idea back to the surface. Several years ago, MIS looked to fourth-generation languages to trim applications backlogs. Two years ago, applications generators seemed to be the development center's answer. Last year, relational data bases were held up as a solution; this year it is CASE tools.

Yet none of these solutions has made enough impact on the applications development process, and many have become expensive "shelfware."

Mechanize or automate?

If the MIS department is merely trying to mechanize what it traditionally has done manually, it can do so with simple tools. Tools that mechanize existing techniques and processes can be implemented with little regard to human issues. By definition, they inflict minimal change on the status quo.

If, on the other hand, MIS is really attempting to transform the development process with automation, it needs to do more than just choose new tools and techniques: It needs to think and act in application terms.

Application development is an application just like any other we might try to computerize, although we rarely consider it as such.

In fact, one justification for the development center concept is the recognition that if your applications are backlogged, you should take each application in that backlog and slip it down one level in order to make room for your highest priority application — application development.

The application view

Other aspects of the application view of application development become apparent by considering the resources applied to and the approach taken with any important application.

First, MIS typically dedicates qualified resources to analyzing the application problem. Analysts work closely with end users to determine the true nature of the application problem and define the solution's requirements and its expected benefits. The solution's costs and resources are estimated, and a feasibility study determines whether the required resources are justified by the benefits.

The solution typically encompasses more than just technology. Detailed implementation plans are worked out, including acceptance tests, parallel runs, user training and documentation. Computer resources are provided to ensure the application can actually run and perform adequately. Manual and support systems are adapted as required by the end users.

Once implemented, ongoing hot-line support assists the application's user by answering questions and resolving difficulties. If the application requires modification to meet changing user needs or to take advantage of evolving technology, the MIS function again acts on behalf of end users to ensure that they are fully served and are exploiting technology to their best advantage.

End users are never simply given raw technology. They are not usually expected to figure out how to use the application for themselves. They rarely suffer woefully inadequate machine performance and poor availability. MIS tries to provide end users with a level and scope of assistance that preempts their attempting to choose and implement their own solutions without regard to an underlying architecture and standards.

Compare this typical user application scenario with the "application development" application, and an understanding emerges of why so many attempts to leverage application development productivity with automation have failed. The potential value underlying the development center approach becomes apparent.

When application development is viewed as an application, important and familiar issues surface. Do we want to buy the application development application off the shelf? Will we build our own development automation or implement some combination of purchased technology and components built in-house? Can we manage by breaking the problem down into discrete pieces, or do we need an integrated solution that encompasses the entire application development life cycle?

If we wish to buy a ready-made application, how will we customize it or change our processes so that it fits our environment? If we intend to build the application, who will be responsible for the definition, development and maintenance activities? If a combination is our choice, who will act as systems integrator?

Once MIS recognizes this aspect of application development, it can begin to approach it as it would any major application. It can appreciate that selecting isolated technology and making it available to developers is not likely to produce significant results in the long haul.

> IF simple mechanization of existing processes and techniques is the goal, standardization is not a critical issue. But if real automation is to be applied to the software manufacturing process, standardization becomes an essential requirement.

Those charged with improving application development productivity can understand the need to work with users — in this case, the development community — to analyze the development application and understand where the system bottlenecks lie, where the real opportunities for improvement exist and what it will take to exploit those opportunities.

Users, tools, resources

Even if MIS thinks it understands the developer's problems and the potential solutions, its application experience shows that if the ultimate end users are not deeply involved in the solution's analysis and design, they will be less inclined to buy into it.

The application view also indicates MIS must provide adequate training, not only in the tools, but also in how those tools fit into the overall application environment, including the non-computerized procedures surrounding the application. It is not sufficient to tell end users, "This is how you use this screen, and this is how you use that screen." They must understand how all the pieces fit together and how they can use the application to meet their needs.

MIS must provide adequate and appropriate computer resources to run the application. It appreciates that a central, ongoing source of in-depth expertise must exist so that, even if the development staff turns over, the application continues to provide value. MIS understands that user needs will evolve and that the application must parallel that evolution. It appreciates that dedicated resources will be required to maintain the application development application. The development center addresses these issues.

While there are as many variations on the development center theme as there are development centers, a center's primary responsibilities typically include providing the following:

- A support staff to analyze, develop and implement optimized application development systems and educate the development community in those new systems.
- On-line access to a set of integrated, complementary tools.
- An appropriate operational environment, including a 1-to-1 programmer-to-terminal ratio, subsecond terminal response time and a batch turnaround time of less than 15 minutes.
- Adequate disk storage.

Other important tasks performed by the development center include the following:

- Provide a consulting role on projects.
- Facilitate joint application design-type sessions.
- Provide a "help line" to developers.
- Measure progress and return on investment.
- Monitor quality trends.

The application view of application development leads the development center to focus on several critical factors that must be addressed if the software development processes are to be significantly automated.

Standardization of development and maintenance processes. Before it is possible to substantially automate application development or any other complex activity, it is necessary to standardize the processes. Indeed, the MIS community for years has been trying to counsel end users in the need to standardize business procedures before any real automation leverage can be achieved.

Given the costs involved in evaluating, selecting, acquiring and implementing development technologies, it makes sense to standardize development processes to the greatest degree possible. Again, if simple mechanization of existing processes and techniques is the goal, standardization is not a critical issue. But if real automation is to be applied to the software manufacturing process, standardization becomes an essential requirement.

Market to the development community. Vendors of application development tools typically do a good job of marketing their wares to prospective users. For the vendor, the selling typically stops when the contract is signed. At that time, the vendor switches into a support role, stepping back until the customer needs something, such as support, training or a new feature.

For the customer, however, this is the point at which the selling really needs to start. Managers and decision makers — those

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who hold the purse strings — may have been sold on the product, but they do not have to use it. The users — the analysts and programmers — who must make the product successful were not on the receiving end of the vendor's skilled selling activities.

Enter the development center. It picks up where the vendor leaves off, with the role of "selling" the product to end users.

In fact, if we apply the term "marketing" correctly, it goes beyond selling to include all the activities associated with determining marketplace requirements, creating an environment in which the products or services will sell and, finally, selling to that marketplace.

The development center is very much involved in a marketing role. It surveys and works with its marketplace — the development community — to determine needs and solutions. The center then creates a strategy for communicating with its marketplace and creating a positive desire for its products and services. The development center understands that its sale is not complete until the services and products it offers are successfully in use throughout the development community.

Methodology or technology? The application view of application development also tells us that technology must be considered in the broader context of methodologies and process. As such, the development center is usually organized along two distinct tracks. One track, which is essentially technical, is responsible for tools and techniques; the other, analytical, takes care of methodology and process issues.

> MIS MANAGERS who want productivity improvement but will not dedicate human resources to that challenge are not really committed to do what it takes. They are simply looking for a quick technology fix.

The tools and techniques track considers areas such as technical standards, tool selection and integration and configuration management for the development environment. The methodologies and process track considers such areas as project management, standards and guidelines, measurement and analysis, quality assurance within the development process and liaison between users, project teams, data resource management and technical resources.

Both tracks share the responsibility of educating and communicating with the development community.

Staffing. As with the information center, there is no set model for development center staffing. Often, staff members are co-opted from within the development groups or are cycled between the development center and the development teams. These tactics keep ideas fresh and prevent the development center from being viewed as an elitist group lacking the real experience of day-to-day development challenges.

Some development centers also serve in a training capacity, with junior employees assigned to the development center for apprenticeship. This strategy seems to be effective in that novice developers tend not to have preconceived ideas about how the work ought to be done and are usually quick to accept new ideas. However, a balance must be maintained between junior staff and trainees and experienced personnel.

As with the information center, choosing the right staff for the development center can be difficult. The people chosen will be critical to the center's success. Development center members should be respected by the developers they will serve. They should display excellent people skills as well as good project discipline and leadership skills. In addition, communication skills and marketing savvy are important — probably more so than strong technical expertise, which can usually be found elsewhere within MIS.

The measure of success

Merely accepting the concepts, co-opting a few spare resources and putting up a shingle that says "development center" is unlikely to garner the potential benefits that can be achieved through a well-implemented development center. Like any other important application, the investment in the development center is not small and cannot be treated lightly.

I have come across many unfortunate situations in which a couple of keen individuals were set up as development center pilots, charged with revolutionizing development productivity and quality — and given a six-month time frame in which to do it.

The first problem they face is just exactly how to show success. Ultimately, the impact of the development center (or of any other investment in productivity) cannot be assessed without effective metrics. If these are not already in place, the development center's first charge will be to institute a measurement plan. This alone can take six months to get started, with little to show for the effort for perhaps a year.

At the end of the six-month experiment, management may wind down the development center for lack of meaningful results. But center staff members do not constitute only overhead — they are also valuable development resources that are desperately needed on development teams. After all, if there had not been a shortage of skilled development resources, the experiment would not have been approved in the first place.

Management must recognize and avoid the temptation to view the development center as overhead. It needs to resist succumbing to the constant pressure to distribute the development center resource — its staff members — back into the mainstream of the development community, where they will become part of the problem they were intended to solve.

Funding issues for the development center need to be addressed from the outset. Again, as with the information center, the development center uses some form of chargeback approach, with development center costs charged back to the developer through the individual development projects. By using this approach, both the development center and its users are more inclined to monitor cost-effectiveness and avoid the overhead trap, thereby introducing the checks and balances essential to the center's long-term viability.

This kind of premature development center failure (also common in the early days of the information center) must be preempted by a management prepared to commit itself to providing the necessary time and resources to allow the development center to bear fruit. In fact, the development center is the most visible sign of commitment to productivity improvement.

MIS managers who want productivity improvement but will not dedicate human resources to that challenge are not really committed to do what it takes. They are simply looking for a quick technology fix.

The commitment should be expressed through a mission statement, set by the senior MIS manager. This statement provides the center's objectives and acts as a constant reminder of those objectives throughout the center's implementation. It should spell out exactly what services the development center provides and what development managers should expect from it.

Strategic approach

The tactics of the development center will change as it grows and matures and as its influence on the development process is felt. Initially, the development center will attempt to stabilize the development environment. The focus will be on life cycle methodology, measurement and the basic tools. At the start, the analytical role of the development center will predominate, as the center determines the characteristics of the existing development environment and opportunities for improvement.

It is important that the development center not be too ambitious or create unrealistic expectations early on. The center should not expect to make significant visible contributions for at least a year or so.

Once the development environment is understood and stabilized, the development center can focus on finding better ways to satisfy application requirements — applying automation to the development life cycle.

As the development center matures, its strategies for direction, control and support will change as the focus shifts from mechanization through standardization to automation.

The human dimension

With growing application backlogs, the development professional becomes the most critical user. With an ever-growing array of new development tools and technologies, MIS needs an organized approach to evaluate and select appropriate products.

With the constant evolution in systems engineering skills and disciplines, we need a channel whose responsibility includes ensuring that the needed skills are being learned and effectively applied. With the natural human resistance to change, we need a dedicated, skilled change agent to ease the pain and cost of absorbing new technologies.

If we are really serious about bringing high technology to the application development arena, the development center is an excellent place to start. •

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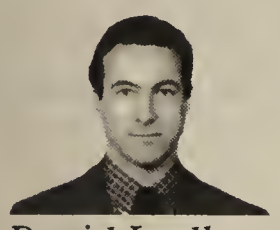

David Ludlum

In search of teamwork

Generating effective teamwork is key to boosting or maintaining the productivity of MIS projects.

The process of nurturing teamwork should be of particular concern to MIS managers seeking to develop the "people skills" so sought after in the age of disseminated computing power, when development teams increasingly include users.

Generating teamwork also is crucial to the manager who is out to broaden his influence within the organization, since teamwork is relevant to many of its endeavors. In a recent interview, Robert H. Waterman Jr., coauthor of the best-seller *In Search of Excellence*, said that in successful companies he has studied for his forthcoming book, management groups up and down the corporate ladder operate as a team. He cited a training program at a major bank that stresses teamwork and interpersonal relationships among employees.

Athletic teamwork

Athletics provide an excellent focus for examining teamwork, a point noted in a recent article in *The New England Journal of Medicine* titled "Psychiatric consultation in professional football." The author, psychiatrist Dr. Armand M. Nicholi Jr., writes that the weekly, decisive clashes of professional football teams offer a good opportunity to observe how personal relationships affect the functioning of an organization.

Nicholi describes three years of work with the New England Patriots stemming from a request from players and management that he help the team reverse "a 20-year history of failure and frustration" despite talented individual players.

He alludes to a theory he had formed: An organization is a group of people sharing a common task, and its major stumbling blocks concern interper-

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Governor downloads state data

Sununu takes hands-on approach to N.H. financial management

BY MITCH BETTS
CW STAFF

While many chief executives want to see only the summary reports from their management information systems, John H. Sununu is of a different breed. Sununu, the governor of New Hampshire and master of a $1.3 billion annual budget, says he wants to download the raw data to his micro spreadsheet.

"My style of trying to solve a problem is to cut through the bias that occurs when people summarize data and pass it up to the next layer. I'd rather go to the raw, unadulterated data," Sununu says.

Given his background, it is not surprising that the governor makes heavy demands on state information systems. He has a Ph.D. in engineering from MIT, and before entering politics, he wrote technical software for clients of his consulting firm. Today, Sununu uses a PC in his office and a laptop in his car.

Vital tools

The Republican governor, who is trying to run the state more like a business, says he views computer systems as vital tools for improving administration and decisions.

When Sununu took office in 1983, the state had a nearly $50 million deficit, and its batch reporting systems failed to provide timely financial data. Consequently, he launched a major overhaul of the financial systems to provide on-line access.

N.H. Governor Sununu

In an interview and a recent speech to the National Governors' Association, Sununu described his hands-on approach to implementing the new system.

The governor, in search of state-of-the-art software, specified that the system must create an integrated data base for all financial information.

By 1984, the state had selected Arlington, Va.-based American Management Systems, Inc. (AMS) to install, customize and implement AMS's Government Financial System package on IBM hardware. The hardware and software contract totaled $2.4 million.

The New Hampshire Integrated Financial System went live with central accounting, payables and budget-control applications on July 1, 1985. The state added a personnel module in 1986. Running on a dedicated IBM 4381 with a network of 167 terminals, the integrated system handles more than 60,000 transactions or inquiries each day at 27 agencies, AMS officials say.

This year, the state and AMS entered a "strategic partnership" in which New Hampshire beta tests AMS products and shares results with other states.

'Actively involved'

"What made this contract different from our other government contracts is that the chief executive got much more actively involved in the technical aspects of the system because of his personal interest and technical expertise," says Paul Hudecek, an AMS vice-president.

So far, the system has had numerous benefits, Sununu reports. "I am absolutely convinced that we have been able to capture about 1% to 2% of the state budget by virtue of this access to data alone," he says.

Sununu says the financial management system helps his office accomplish the following:

- Identify agencies that tend to spend most of their funds in the last quarter of the year for fear of losing them at the end of the year.
- Improve budget analysis and cash management and track personnel trends.
- Identify funds that need to be transferred (with legislative ap-

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Coast bank seeks PC security

BY JEFFRY BEELER
CW STAFF

SAN FRANCISCO — At Security Pacific National Bank, as at many other large companies, reliance on personal computers has grown during the past few years to reach major proportions. "Lots of our critical systems are now running on micros," said Security Pacific Vice-President Sandra Lambert.

The pervasiveness of Security Pacific's PCs and the sensitivity of their financial applications has made microcomputing a growing concern to the full-time guardians of the organization's information security.

Lately, micros have emerged as one of the bank's five hottest security-related issues, Lambert said at an American Bankers Association conference held here recently.

In response to the development, Lambert's bank has drafted its own personal computer security guide, which consists mainly of practical tips for safeguarding data from accidental destruction and unauthorized disclosure, she said. Issued to each in-house PC user, the guide is separate from the bank's existing information systems security manual, which is far broader in

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MANAGEMENT MEMO

Faulty VDT shields cited; firms mum on computer theft

Swedish researchers have reported 100 cases of a certain type of antistatic VDT screen failing to work after six months of use, according to "VDT News," a New York newsletter on health and safety issues related to VDTs.

Researchers Mats Berg of Karolinska Hospital and Ingvar Langlet of the National Institute of Radiation Protection reported in the leading English medical journal *The Lancet* that the VDT's carbon-treated nylon-mesh shields did not reduce electrostatic fields.

The reason for the failure is not clear.

The researchers were investigating suspicions that electrostatic fields from VDTs have caused skin rashes among 150 patients of the Stockholm hospital.

The low humidity of northern Europe is thought to contribute to the occurrence of the rashes.

The VDTs in question were manufactured by Power System AB in Stockholm.

Carbon-treated nylon-mesh screens are sold by several companies in the U.S., including a subsidiary of Power System, Screen Data Corp. in Whippany, N.J.

An official of Screen Data challenged the Swedish findings.

Financial institutions that lost money from computer abuse violated federal law by failing to notify the police in eight of 12 cases studied by a pair of University of Minnesota researchers.

The losses from the unreported incidents ranged from $400 to $10,000, compared with losses of $15,000 to $150,000 for those that were reported, according to the study conducted by Detmar W. Straub Jr. and William D. Nance of the university's Carlson School of Management.

Of a total of 268 reported cases of computer abuse examined by Straub and Nance, only 5% of those — cases in which the perpetrator was — known led to prosecution.

However, those prosecutions resulted in a conviction rate of 70%.

The study also found that "high-privileged" employees such as managers, auditors and systems programmers who were punished for computer abuse were disciplined less severely than lower level employees.

Corporate managers face opportunities and challenges from new technologies that are facilitating automation of work outside the office, according to a study by The Diebold Group, Inc.

Improved semiconductors, digital-cellular radio, portable computer screens and scanners are facilitating automation of warehousing, distribution and sales, according to Diebold.

That could improve communications with remote operations and enhance control of them, perhaps allowing a manager to supervise a greater number of field workers, the firm said.

Another issue is training new users: If work is relatively unskilled and new automation applied to it is relatively sophisticated, managers may face a choice between retraining employees and replacing them, the firm said.

N.H. system sparked struggle for access

Development of a comprehensive financial information system for the executive branch of New Hampshire's state government stirred up a controversy over whether state legislators and the public should have direct access to politically sensitive data.

So far, there have been 11 legislative proposals to open the system to outside access [CW, June 10, 1985], but each has been defeated because of Gov. John H. Sununu's opposition to unlimited access, according to an aide to the governor.

Sununu reportedly considered the proposals an intrusion on the powers of the executive branch.

To resolve the issue, the 1986 session of the legislature enacted measures allowing citizens and legislators the right to get source documents, final reports and computer printouts.

However, citizens and legislators were not granted direct access to the computer system or access to unfinished work papers, according to the governor's aide.

For his eyes omly?

Sununu argued that data in the financial system is equivalent to work papers in a filing cabinet, which may contain confidential information.

"Just as there is no implicit right for legislators or the public to come and run their fingers through my filing cabinet, I argue that there is no implicit right for them to have universal access on an instantaneous basis to all the information" in a computer system, Sununu said.

The general rule should be that legislators and the public should have access to information, but it should be provided by the executive branch as a final report, based on the computer data, the governor added.

MITCH BETTS

Governor

CONTINUED FROM PAGE 67

proval) from an underused account to a needy account.

In addition, the governor's reputation for digging deep into the information system also keeps the pressure on state agency officials to justify programs and policies using accurate and timely data.

"I make no bones about it. One of the reasons for going to this kind of system, with the kind of access that a chief executive has under it, is to let them know that we probably have more data than they have. It's amazing how it improves the quality of response that you get," he said.

"The most important impact we've seen from the whole system is that the communication of basic information up and down the departments is much more intense than it ever was," the governor added. The state reportedly plans to add functions such as budgeting, purchasing and payroll. Sununu said he is especially looking forward to integration of the payroll system because it seems impossible for any governor to know exactly how many people are on the state payroll.

"I will know we have done our job when we have a button, maybe my F6 button, that I can hit and it will tell me at any given instant how many people got a state paycheck last year," he said.

Micro security

CONTINUED FROM PAGE 67

scope and deals more extensively with general policies than does the micro-oriented publication.

To systems professionals, many of the PC security guide's pointers might seem painfully obvious and simpleminded. "We warn our users, for example, not to bend their diskettes or spill coffee on them," said Lambert, who heads the bank's information systems security effort.

But to the guide's target readers, most of whom are computing novices, the advice is necessary and anything but commonsensical.

Fears about the growing risk of PC security breaches have also contributed to the bank's recent decision to adopt an unorthodox practice that Lambert and her staff call "Noontime Theater." As its name suggests, the technique consists of prepared presentations that coincide with lunchtime and examine information security in what is intended to be an entertaining as well as instructive format.

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Colleges

CONTINUED FROM PAGE 1

and president of the local chapter of the Society for Information Management (SIM).

In an exclusive *Computerworld* survey of more than 700 MIS managers, an underwhelming 4.8% of the respondents rated the training that universities are providing for future MIS employees as excellent. Although 56% rated the training as good, a full 39% said they felt that training was fair or poor. The computer science graduates, respondents indicated, were sorely lacking in communications *and* business skills but displayed adequate technical skills.

In addition, MIS managers indicated that the graduates of MIS programs in schools of business are not necessarily fulfilling the needs of their departments despite the hype offered by the universities themselves.

'Unrealistic' goals

"The people coming from graduate MIS programs have unrealistic and lofty expectations about salary and positions," says J. Roy Davis, manager of the systems operations laboratory at Hughes Aircraft Co. in Long Beach, Calif. "They expect to be president of the company in a year-and-a-half. They tend to focus on what they would be doing at age 45 rather than 25, and many don't get the hard grounding in technology. As for the management knowledge, they tend to play the management sound game, parroting what they learned in school but not really knowing what they are talking about."

For MIS executives, the concerns about recent MIS graduates stretch on:

- Though several MIS programs in schools of business enjoy good relationships with certain employers, a significant number of MIS departments continue to hire computer science graduates only, preferring their technical skills and showing a willingness to train them for management positions. According to the *Computerworld* survey, fully 77% of the respondents preferred to hire computer science as opposed to liberal arts graduates.
- A majority of graduate MIS students come directly from undergraduate studies and lack any hands-on work experience. The expectation that a master's degree in MIS guarantees a higher level, higher paying position is turning off MIS managers who do not want the burden of introducing disgruntled entry-level employees to reality.
- As the falloff in enrollment in MIS starts to affect the pool of available talent, costs of finding and staffing MIS departments are going up.
- The advent of the personal computer has drawn student interest away from large-systems courses and such language training as Cobol. Courses in artificial intelligence and personal computing hold the glamour spots in curricula, resulting in only partially trained graduates.
- Though many MIS professionals are actively involved with universities — sharing ideas and knowledge about the state of their field — others are openly questioning the value of going into the profession and are steering graduates toward other fields.
- Both MIS professionals and directors of university programs realize that a strong publicity campaign must be implemented, not only on college campuses but also with high school guidance counselors, to correct misperceptions about the MIS profession.

Get rich, young man

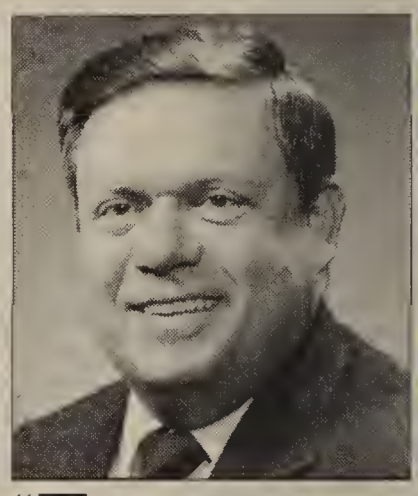
Attracting students to MIS programs is growing increasingly difficult. The business school programs are losing potential students to the lure of riches in finance careers, and the field of MIS itself is considered ill-defined and "mushy" by educators. As a relatively new area of study, MIS sends confusing signals to potential majors.

Primary among the reasons for confusion is the fact that employers vary so widely as to what they are seeking. Some MIS shops simply want entry-level programmers — in fact, according to the *Computerworld* survey, 83% of all recent graduates are hired as programmers.

But there is also a burgeoning need for professionals in systems analysis, end-user computing, development and software maintenance. And the profile of the ideal candidate has changed with the mandate from corporate America that MIS provide a strategic and competitive advantage to the business. Business and communication skills now rank as high as, if not higher than, technical skills, and finding that mix is difficult for employers. Many of the top business school MIS programs stress that they maintain close ties to the business community to monitor its needs — but that contact can be misleading.

According to the *Computerworld* survey, nearly 70% of the respondents hire from different universities each year and, therefore, cannot be assured of getting similarly trained graduates. In addition, MIS departments hire from institutions ranging from vocational and technical schools to university computer science departments and graduate schools of business. The profile of the new hire, therefore, can vary significantly.

The universities themselves feel the pain of this confusion. "The toughest problem facing our program is that companies don't have a well-defined entry position and career path for this type of graduate," says Darwin Klingman, director of the MIS program at the college of business administration at the University of Texas at Austin. "Corporate recruiters visiting our campus don't really know where our graduates fit in. Many people associate our graduates with computer science or electrical engineering grads. They feel that if it deals with computers, it all means the same thing."



"I SENSE a very low intellectual curiosity [among students] today. The attitude is, 'How long will I have to program before I can become a manager?' "

J. ROY DAVIS
HUGHES AIRCRAFT CO.

In addition, interest in computer careers is down, which is, ironically, a mixed blessing. Academicians are just as happy to be relieved of the "gee whizzers" who were drawn only by the industry excitement that the early 1980s spurred. But that loss of potential talent hurts, both in schools and in corporate America, in terms of simple numbers.

The Me Generation

And though employers believe widely, according to the *Computerworld* survey, that the quality of students is higher than it was five to 10 years ago, there is still a sense that career goals outweigh a true interest in and love of the field itself.

"A lot of students taking computer science today are just doing it because they believe it will lead to good jobs and not because

MIS education: What bosses want

In order to assess the satisfaction level of MIS/DP executives with the training received by their recent hires, *Computerworld* sent 2,000 questionnaires to MIS professionals on its paid-subscriber list. More than 700 (37.1%) responded to a list of questions focusing on MIS and computer science education and its impact on recent graduates.

Among the significant findings are the following: Nearly 40% of the respondents were only lukewarm — that is, gave a fair or poor rating — on the quality of training that computer science programs were providing for potential MIS employees, and only 4.8% of those polled rated the training as excellent. In the rating of the importance of skills in recent graduates, interpersonal skills ranked even higher than technical skills by a margin of 51% to 48.4%. In addition, 75.3% of the respondents said they believe that general business skills are either important or very important in recent graduates.

Reflecting the changes in the MIS environment in corporate America, communications and interpersonal skills ranked at the top of a list of needed skills for graduates to bring to MIS departments. In fact, when asked which skills were most deficient among computer science graduates, 45% of the respondents noted interpersonal, business and verbal and written communication capabilities.

Ironically, despite these deficiencies, 45% of the respondents said they felt that current graduates are better prepared educationally than those of five to 10 years ago. And 77% said they prefer to hire computer science graduates over liberal arts graduates for MIS positions. The foundation in technical skills was the overwhelming reason for such a preference (69.3%).

The survey also noted that most bachelor's degree graduates in computer science (47.9%) will find starting salaries of $21,000 to $25,999, while the average starting salary for a master's degree recipient in computer science falls between $25,000 and $30,999. The average $5,000 difference bears out the fact that a graduate degree does not reap the kind of lucrative rewards that an extra year or two of school might seem to promise.

GLENN RIFKIN

- What one skill have you found to be the most deficient among recent graduates?

	Percent of total answering
Interpersonal skills situations	18%
Verbal and written communications skills	13.9%
Business skills	13.1%
Logic/problem solving/analytical skills	12.8%
More hands-on training/real-world experience	8.4%
Programming languages	6%
Programming/Documentation	5.7%
More technical skills	4.1%
Systems analysis/design	3.3%
Application development/ Software design	1.9%
Data base knowledge	1.1%
Other	15.1%

CW CHART

- If you could make one suggestion to educators about what to teach in computer science programs, what would that be?

	Percent of total answering
Business acumen	19.9%
More actual-less theory/real-world applications	17.8%
Communications (oral and written) situations — work experience	9.3%
Interpersonal skills	8.5%
Logistics/problem solving/ analytical skills	8.5%
Emphasize the practical	7.9%
Programming/Documentation	7.4%
Working with users, customers	7.1%
Programming languages	6.6%
Thorough, well-rounded education skills	6.3%
Systems analysis/design	5.5%
More technical	4.1%
Other	16.1%

"I AM CONCERNED . . . that MIS professionals would not encourage their children to go into this field."

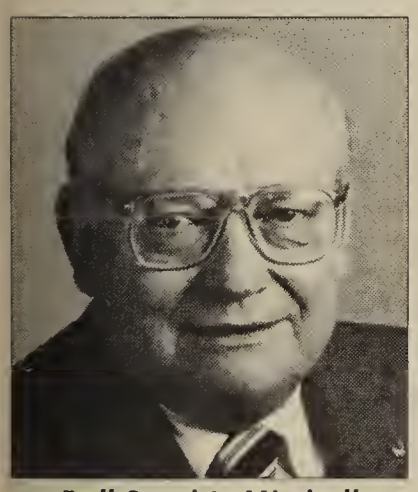
MICHAEL HESCHEL
BAXTER TRAVENOL LABORATORIES, INC.

they really relish it," Hughes Aircraft's Davis says. "I did programming for 17 years and worked a lot of 60-hour weeks because I loved it. If it's just a job, it's not as easy to do well at it. I sense a very low intellectual curiosity today. The attitude is, 'How long will I have to program before I can become a manager?' "

In addition, as the field itself has changed dramatically in recent years, a certain cynicism about the profession has permeated MIS and impacted future employees. "I'm concerned with what I've read that says MIS professionals would not encourage their children to go into this field," says Michael Heschel, corporate vice-president for information resources at Baxter Travenol Laboratories, Inc. in Deerfield, Ill. "They sense that decentralization of applications and departmental computing will make MIS obsolete. But there is a lot of work to be done before decentralization reaches a maturation point."

For many employers, a graduate's particular academic discipline is unimportant because of extensive internal training programs that all new employees must complete regardless of the diploma they hold.

"No one can teach in a university the array of skills we need,"



Bell South's Mitchell

says J. W. Mitchell, MIS vice-president of Bell South Corp. in Atlanta. "What we look for is the aptitude and the desire to do what we need, and then we train them. Our problem is finding the right kind of people." Many educators say they believe, in fact, that it is their job to provide only the theories and concepts of MIS and the employer's job to add the necessary training.

The need for further training is virtually a given across corporate lines. The scope of that training, however, varies dramatically. MIS graduates can expect anything from basic two- or three-week courses to the 1,100-hour, four-year training track given at Arthur Andersen & Co., a Chicago-based Big Eight consulting firm.

Since it hires more than 2,500 people annually worldwide as consultants, Arthur Andersen must bring in a wide range of graduates. According to Simon Moughamiam, managing partner, a computer science graduate and an MBA with a concentration in MIS start at the same base of training.

At Pratt & Whitney Aircraft in East Hartford, Conn., MIS Director Art Simonian points out that he hires mostly computer science graduates but will take virtually any background involving quantitative studies. "We hired a Russian major from Yale who was a knockout," Simonian says. "The disciplines of language and applications programming are very similar, in fact. Besides, as long as a person is high quality, it doesn't matter what the academic background is, because we're going to train them anyway."

Eric Wetstone, a programmer/analyst at Pratt & Whitney for the past three years, came out of the University of Connecticut with a degree in business administration. He took several computer courses during college, and though he felt well-prepared for his entry-level post as a trainee, he says he wishes he had been exposed to such technical courses as IBM's JCL or data base programming. "Any IBM Job Control Language course would have been a plus; it would have sped up my training. But I got that training here anyway," Wetstone says.

Hit or MIS?

Just as there is confusion about which graduates to recruit, there is confusion as to just where in the organization graduates tend to get hired. Many don't enter MIS at all but go to the functional areas of the company as liaisons to MIS.

In fact, Michael Lawson, Boston University's director of the master of science in MIS program, says he believes strongly that successful academic MIS programs can flourish only if they are extremely proactive in coordinating not only which organizations hire their graduates but where in the organization those graduates go.

"When I'm out talking to companies about our program, I'm looking for the company that is pretty progressive in MIS and really sees the strategic value of what we are trying to teach here," Lawson says. "We tend to shy away from companies that still view MIS as just data processing." Lawson points out that graduates may still go to those types of companies but will more likely end up in the functional areas as MIS experts rather than within MIS itself.

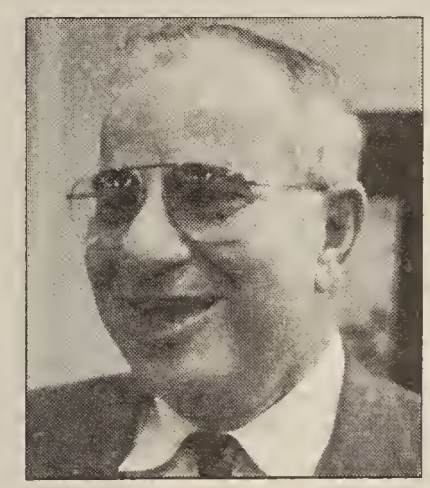
Numbers game

As enrollments decline and functional areas grab top graduates in the coming years, MIS departments will simply be facing a shortage of talented people for both technical and managerial slots. According to Bose's Harkness, the quality of people going into the field is up; it is the numbers that cause concern.

"The big problem is getting the numbers of people in the pipeline," Harkness declares. "We've always had enough people to come in and do the jobs, but that will change in the next couple of years. In the short term, we will solve the problem by paying the switching costs — people jumping from one job to another — but what you will get is the same people — no better, no worse. In the long term, I don't know what the solution is."

As president of the Boston chapter of SIM, Harkness actively promotes MIS as a career. The chapter is initiating a program to reach out to high school guidance counselors and correct misperceptions about MIS. "These people think that if you have a personal computer, you know everything you need to know about information systems," Harkness says. "We've got to establish an effective voice in the education field."

In addition, the chapter has hired a "broker" to bring together professors in MIS programs at local colleges with MIS departments at local companies.



"AS LONG AS a person is high quality, it doesn't matter what the academic background is, because we're going to train them anyway."

ART SIMONIAN
PRATT & WHITNEY AIRCRAFT

These professors will do a version of an internship to get a renewed hands-on feel for what they are teaching.

"We feel that a lot of teachers have become dated and have lost touch with what's really happening in the field," Harkness says. "We want them to rub shoulders with MIS professionals and make sure they are not teaching things that are 10 years out of date."

For MIS departments, many of the current problems in education are transcended by the question marks of the future. The very shape and structure of corporate MIS is changing dramatically as computing power flows out to the end user and systems are decentralized throughout organizations.

At the same time, according to Ephraim McLean, professor of information systems at the University of California at Los Angeles's Graduate School of Management, MIS is "rediscovering the importance of operational systems. Order entry is no longer a low-level priority but in fact can tie us to our customer's workplace. So response time, ease of use and accuracy are not things we can just give lip service to; they fundamentally affect our ability to succeed in the marketplace."

McLean says that because of this situation, the need for a few very well-trained MIS professionals will remain crucial to corporations, and these individuals will not be programmers.

"I don't see the huge numbers growth we once had in this industry," McLean says. "And colleges creating majors around programming needs are going to be training buggy-whip manufacturers. What we are going to need are people who can bridge the gap between the business needs and the technology. And those people will be very highly trained and will command very high salaries."

Hats off to hands-on MBAs

From an employer's point of view, many students in MIS are simply being misled. Ann May, manager of applications systems support in the MIS department of General Mills, Inc. in Minneapolis, has been recruiting MIS professionals for the past 10 years. She says she feels that MBAs with an MIS concentration are extremely difficult to place in the organization.

"If someone gets some work experience before going on to an MBA, fine," she says. "But if they go right from undergraduate studies to a graduate program, there is an awful lot of plain experiential learning that is missing. The kids in a lot of these MIS programs are being deluded. A lot of the companies that are part of the University of Minnesota's MIS research center, for example, won't hire its MIS graduates. We had hired somebody from there and had to send them back for Cobol training."

James Wetherbe, director of the university's research center, admits that it is "a very funny marketplace" and that the product must match the need. He points out that MBAs with no work experience can find it awkward working for a company without a significant training program. "General Mills doesn't have that fast track of training, and, therefore, our students don't want to go there," Wetherbe says. "But a lot of companies around here realize that they have to groom the new hires if they want to get them."

Nonetheless, employers agree that a student jumping directly from a bachelor's to a master's degree in MIS is doing himself a disservice. "MBAs expect a higher position and a higher salary, but they aren't going to get it if they don't have experience," says Michael Heschel, corporate vice-president of information resources for Baxter Travenol Laboratories, Inc. in Deerfield, Ill. "We encourage students to come work here after they get their undergraduate degree and [to] then go back and get the MBA on us. Once they are at a systems analyst level, they'll want an MBA."

Academic curricula that utilize internship or co-op programs are meeting with greater success than simple classroom teaching. A student working in an MIS department handling real-world problems possesses a much more marketable skill. Companies often hire top interns upon graduation.

"We get two main benefits from our student interns," says Warren Harkness, MIS director at Bose Corp. in Framingham, Mass. "They help us get our second- and third-level priorities done when we don't have the resources to handle them. And we identify good people, who we might later hire, in their early stages."

GLENN RIFKIN

Micro security

CONTINUED FROM PAGE 68

The productions, which take place on company premises, typically begin with an eye-catching film and conclude with a live presentation that focuses on a selected aspect of information security, microcomputer-related or otherwise, Lambert said.

Like the PC security guide, she added, the midday seminars pay little attention to theory and concentrate instead on imparting simple advice that the bank's employees can readily use on the job to minimize their chances of exposure. "We teach them things like how to choose a password," Lambert said.

Noontime Theater forms only one element of a much larger effort by the financial institution to heighten security consciousness among its end users. Another facet of the ongoing awareness program, which is also included among the organization's five top security-related issues, involves the use of a "termination/transfer checklist," Lambert said.

In essence, the checklist is a catalog of all the major types of tools — passwords, access codes and the like — that are routinely issued to end users as part of the bank's overall plan for maintaining data privacy. Whenever any employee changes jobs within the organization or leaves altogether, the individual's supervisor is supposed to refer to the checklist to ensure that all relevant security properties have been returned or canceled, Lambert said.

Another of the bank's five leading information security issues involves point-of-sale (POS) terminals, which allow debit-card holders to pay for merchandise by electronically deducting funds directly from their personal accounts. During the past few years, Lambert said, "our product people have been selling POS like gangbusters to merchants, especially grocery stores."

But as the bank's POS business has grown, so has its potential for a serious security lapse. "Some of our participating merchants have installed large numbers of POS terminals that have absolutely no capability for encrypting their data," Lambert said. "That's a problem."

Teamwork

CONTINUED FROM PAGE 67

sonal conflicts rather than difficulties with its primary task.

He first sought to address conflicts between the players and both their coaches and the team's front office. He did so by advocating the principle of a "player-centered" team that he likens to the employee-centered corporations of *In Search of Excellence.* As a result, the Patriots' front office upgraded the team's medical facilities, which the players had criticized.

With the 1985-1986 season, Nicholi thought much of the tension had been resolved, thanks in large part to the recent appointment of Raymond Berry as head coach. But approaching mid-season, the Patriots had a 4-3 record, had nearly lost to the struggling Buffalo Bills and next faced the powerful New York Jets. Nicholi noted that problems remained — many players were focused more on themselves than the team, and two key offensive linemen hardly spoke to each other.

Pulling in a tug-of-war

The day before the Jets game, Nicholi asked the coaches to let him speak to the team alone for 15 minutes; he wanted to remind them of the principles he had been discussing with them in small groups.

Nicholi told a story about a group of 11 ordinary men who, by pulling together consistently, won tug-of-war contests against 11 muscular athletes who didn't pull together. He quoted legendary coach Vince Lombardi on the importance of players caring for each other. He said leadership, which opponents claimed the Patriots lacked, requires getting to know fellow players in order to know their needs. Nicholi wondered whether the players had taken him seriously when, shortly after the meeting, one of them told him the team had adopted a new fight song — "Getting to know you."

The next day, the Patriots beat the Jets 20-13. Afterwards, the players presented two game balls — one to Berry and one to Nicholi, making him, he believes, the first team physician to receive that honor. The Patriots won 10 of their next 12 games to reach the Super Bowl.

Just before the big game, Paul Solman, a Harvard Business School lecturer and public television correspondent, wrote a newspaper column praising Berry and his team as exemplars of the humanistic management style lauded by the authors of *In Search of Excellence.*

The Chicago Bears eventually devoured the Patriots in the championship game, but the Patriots' management style still can be credited with helping the team improve its regular season record to 11-5 from 9-7 the previous year, become the first NFL team to win three playoff games on the road and reach its first Super Bowl.

Nicholi doesn't draw explicit conclusions about the contribution of his consultations. He says the team was motivated by many individuals: coaches, management and players. "No organization can be successful," he writes, "without the efforts of a great number of people working together, caring for and committed to one another and focused on the primary task for which that organization exists."

Ludlum is *Computerworld*'s senior editor, management.

INDUSTRY INSIGHT

Patricia Keefe

Trouble in promised LAN

Break out the resumes. There seems to be a rash of local-area networking companies in strong need of a management pick-me-up.

It appears that scant few across the LAN-scape have paid much attention to the misfortunes of the preceding generation of microcomputer entrepreneurs, some of whom either failed to bridge the gap between successfully developing a product and successfully managing a company or shed much blood in the process of doing so.

Among those currently struggling to either bolster lackluster financials or hold back a flood of departing executives are Sytek, Inc., Corvus Systems, Inc., Proteon, Inc. and DSC Communications Corp.'s Nestar Systems, Inc. unit.

"One thing you're finding a lot is that their investors are very involved" in running the company, says Thomas White, president of The Seybold Group, Inc., a consulting firm in San Jose, Calif.

Avoid mistakes

Banyan Systems, Inc., however, seems determined to avoid the mistakes of its competitors. After devoting its first three years to product development, Banyan recently took an important step forward by appointing Dick Meise, formerly vice-president of marketing with Convergent Technologies, Inc., as president. Banyan is smart enough to know that great engineering alone isn't enough to move the masses. You need a plan, and you have to sell.

Proteon took a similar step last year, but last month it lost its second president in as many years. In departing, Francis Scirocco joined a steady stream of departing Proteon marketing executives, including former vice-president of marketing Tony Bolton.

Also troublesome was the dissolution of Proteon's distribution pact with Novell, Inc. and

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Genicom loses Momentum

Lack of lender OK squelches printer maker's proposed $45M buy-out

BY ALAN ALPER
CW STAFF

NEW YORK — Genicom Corp.'s eight-month effort to acquire Momentum Technologies, Inc. for $45 million ended unsuccessfully last week after the printer maker was unable to get the consent of its chief lenders.

Don Ackerman, chairman of both companies and a general partner at New York venture capital firm J. H. Whitney & Co., said that Genicom's chief lenders were unwilling to bless the deal because the quality of the Waynesboro, Va. firm's debt would be lowered as a result of the Momentum acquisition.

Genicom, Ackerman said, has a bank loan of $30 million, while Momentum owes its lenders $80 million.

Time ran out

The protracted effort to get credit approval rendered the deal untenable, Ackerman said, because the synergies envisioned in merging the two companies were predicated on consolidating operations during the first half of this year.

Genicom announced its intention to buy both Momentum and Centronics Data Computer Corp. last fall [CW, Nov. 3, 1986], several months after the former Mohawk Data Sciences Corp. reorganized as Momentum [CW, May 26, 1986]. The $75 million acquisition of Centronics has been completed.

"If we could have done the deal earlier, consolidated operations and received the benefits in

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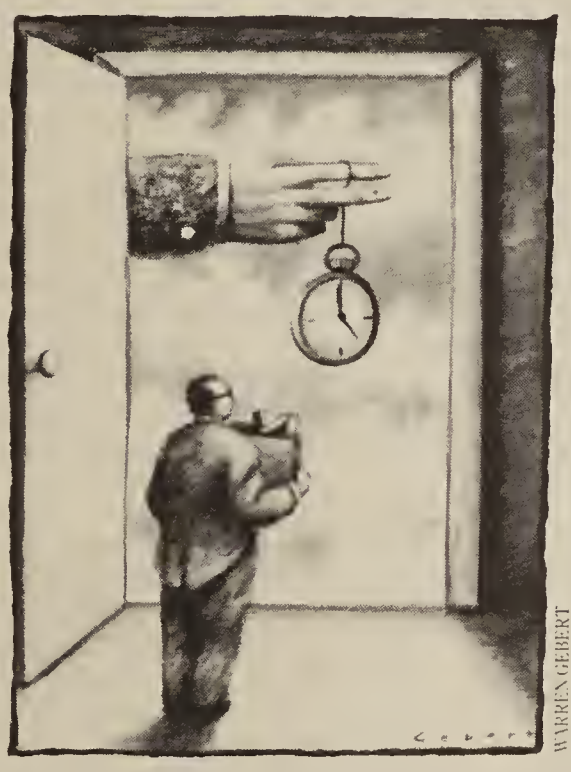
UPDATE

A tale of two cutback plans



WARREN GEBERT

BY STEPHEN BANKER
SPECIAL TO CW

After 28 years with IBM, James Shea, a 54-year-old Philadelphia computer salesman, is taking early retirement. Though he is ready for a new career, the one thing Shea will not do is work for the competition. "I wouldn't even present myself to DEC," he says of competitor Digital Equipment Corp.

Yet Richard Coyle, 46, who spent half his life working for AT&T in Washington, D.C., now heads up U.S. Sprint Communications Co.'s sales effort for the federal government. Despite his years of service, Coyle reacted to his early retirement by competing with his former employer.

The reactions of these two professionals demonstrate the opposite ways IBM and AT&T employees are responding to their

Continued on page 75

High-tech trade gap narrows

BY ALAN J. RYAN
CW STAFF

SANTA CLARA, Calif. — The U.S. is shortening the gap in its electronics trade deficit with both Japan and the rest of the world, but part of the credit goes to the weakening dollar.

According to a recent report by the American Electronics Association (AEA), the U.S.'s trade deficit with Japan in electronics products dropped by nearly 12% to $4.6 billion in the first quarter, $600 million less than the $5.2 billion deficit in last year's first quarter.

The declining value of the dollar helps make U.S. products less expensive in Japan, which in turn makes them more attractive and increases sales. By contrast, the stronger Japanese yen makes that country's products more expensive in the U.S., which helps to balance out the competition, according to AEA spokesman Jeff Parietti.

But while the overall results

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Inside

Vertical focus breathes life into MAI Basic Four

BY CLINTON WILDER
CW STAFF

TUSTIN, Calif. — In the last year or so, vertical markets and "solution selling" have become the computer industry's favorite buzzwords. But an industry-specific approach to the computer market has been the modus operandi for MAI Basic Four, Inc. since its birth, or more accurately rebirth, in January 1985.

Thanks to its unyielding focus on vertical markets in the U.S. and, overseas, MAI Basic Four has rebounded strongly from its days as a loss-plagued casualty of arbitrageur Asher Edelman's hostile takeover of Management Assistance, Inc. in 1984.

After a bitterly contested but successful proxy fight, Edelman proceeded to sell off Management Assistance piecemeal. New York investor Bennett LeBow, who bought MAI's Basic Four Information Systems business for about $100 million in cash and securities and still controls 59% of the stock, is glad he did.

After posting a loss of $10.2 million in fiscal 1984, MAI Basic Four turned profitable in 1985 and earned $9.1 million ($16.9 million before a one-time charge) on sales of $281 million for the year ended Sept. 30, 1986. In the first two quarters of fiscal 1987, the firm's profits

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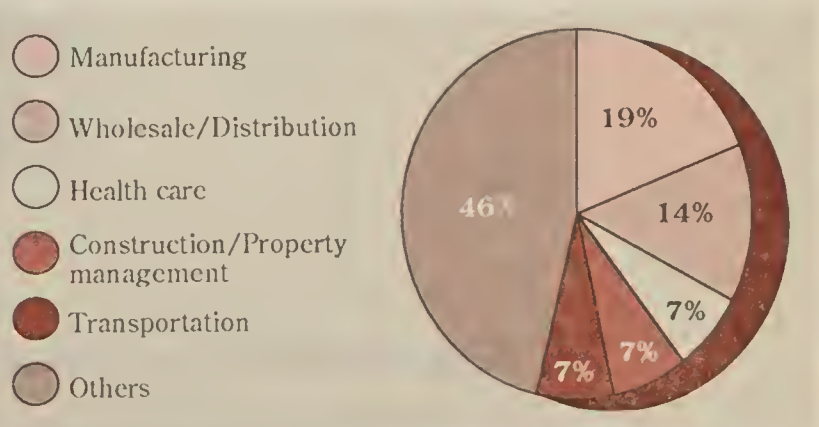
MAI Basic Four's vertical markets, fiscal 1986

Vertical markets accounted for 45% of total revenue; the firm hopes to raise that to 80% by 1991



INFORMATION PROVIDED BY MAI BASIC FOUR, INC.
CW CHART

Esber named to Pansophic board

Election of micro software CEO to large-systems software house a first

BY CLINTON WILDER
CW STAFF

OAK BROOK, Ill. — In an unusual software industry pairing, Ashton-Tate President and Chief Executive Officer Edward M. Esber Jr. last week was named to the board of directors of mainframe systems software vendor Pansophic Systems, Inc.

Esber's election came when Pansophic expanded its board from five members to seven.

Pansophic is the first major large-systems software house to elect the CEO of a top microcomputer software vendor to its board.

Torch passed

Pansophic also announced that Vice-Chairman and CEO David J. Eskra, 46, has been named chairman, succeeding company founder Joseph A. Piscopo.

Piscopo, 42, announced that he will retire to pursue personal interests. Pansophic President and Chief Operating Officer William G. Nelson IV will remain in his position as the No. 2 executive behind Eskra.

Piscopo also retired from his seat on the board.

Comparison drawn

Software industry analyst Tom Lawton, editor of the "Computer Services Report" newsletter in Belmont, Mass., compared Piscopo's departure with that of Cullinet Software, Inc. founder John Cullinane.

Cullinane announced he will leave his Westwood, Mass., company in September [CW, May 4].

"Like Cullinane, he had been spending less and less time in operations," Lawton said of Piscopo. "First, he brought in Eskra as president, then gave him the CEO job, then brought in Nelson as president.

"Some people thought Pansophic management was too top-heavy," Lawton continued, "but that was only because Piscopo was planning to leave."

Nelson was also named to the Pansophic board, along with former Chairman Emil M. Piscopo. Emil Piscopo replaced Joseph Piscopo, his nephew, on the board.

Sorbus, TRW division appoint new top execs

BY STANLEY GIBSON
CW STAFF

Sorbus, Inc. and TRW, Inc.'s Customer Service Division, the U.S.'s two leading independent computer maintenance firms, both recently appointed new top executives.

Sorbus parent company Bell Atlantic Corp. last week appointed Thomas A. Vassiliades president of Sorbus. Vassiliades, 51, had been group director of software service for IBM.

Vassiliades succeeds Louis J. Ross, also formerly of IBM, who was named chairman of the board of Sorbus. Ross, 58, also continues as president of Bell Atlantic's Customer Service Group, which oversees Sorbus's operations.

TRW named Paul H. Snyder vice-president and general manager of its Fairfield, N.J.-based Customer Service Division. Snyder, a nine-year TRW veteran, was most recently vice-president and general manager of TRW's Electronic Assemblies Division. He succeeds Maynard D. Smith, who retired earlier this year.

Sorbus's Vassiliades recently retired from IBM after a 30-year career; his duties were mainly in the service area. Most recently, he was group director of service-business product planning at IBM, where he managed some 3,000 workers and was responsible for resolving problems with system software.

'Mr. Aggressive'

"He's Mr. Aggressive. He's very staff-work-oriented and an incredibly knowledgeable guy," said Donald Goodspeed, president of Computer Maintenance Consultant, Ltd. in White Plains, N.Y. Goodspeed is also a veteran of IBM's service operation.

"The IBM retirement offer was so interesting from a financial point of view that these guys — such as Vassiliades — jumped on it," Goodspeed added.

Separately, Sorbus announced that it acquired Pacific Computer Corp., a privately held computer maintenance company headquartered in Milpitas, Calif.

Thomas A. Vassiliades

The firm is the largest independent maintenance provider specializing in servicing Amdahl Corp. equipment, according to Sorbus.

Pacific Computer's sales were approximately $4 million in 1986. The company employs 21 field engineers and operates in seven major cities in addition to the San Francisco Bay area and Silicon Valley, Sorbus said. "We will integrate Pacific Computer into Sorbus immediately," Ross said.

"They're trying to acquire some big-system skills and are trying to branch out from the traditional System/36 and 38 market," Goodspeed said of the acquisition. He added that the acquisition of Pacific Computer and the hiring of Vassiliades were signs that Bell Atlantic is trying to stimulate Sorbus to become more aggressive.

Wang vice-president quits

LOWELL, Mass. — Robert L. Doretti, Wang Laboratories, Inc.'s former senior vice-president of U.S. operations, resigned last week from his current position as senior vice-president of corporate communications.

Doretti had been replaced as chief of U.S. operations last fall by Ian Diery, who had spearheaded the growth of Wang's European business. Doretti became the most recent of several senior Wang executives who have left the minicomputer maker since the resignation in 1985 of John Cunningham, the company's former president.

Doretti, who did not specify his future plans, said, "When you work at a family-run company, you can climb the ladder only so far." The sentiment echoed those expressed by both Cunningham, now chairman of Computer Consoles, Inc., and former Wang Senior Vice-President J. Carl Masi, now president of International Data Corp.

Other top executives who have left Wang in the past two years include former Vice-Presidents Jon Kropper, Richard Connaughton, Samuel Gagliano, Edward Garcia, Ralph Crusius, Stephen Jonas, Joseph Klementovich and Robert S. Kolk.

Doretti was replaced by Peter McElroy, a 10-year Wang veteran.

Cutbacks

FROM PAGE 73

companies' cutback policies. According to both affected employees and outside observers, IBM's policy of voluntary early retirement has reaped beneficial results, while AT&T's layoff and early retirement plan has brought about negative reactions.

"The loyalty issue was something I had to wrestle with," Coyle says. "But I didn't initiate this action, they did."

Employees inside the company have also responded negatively to AT&T's methods, says Dick Kuehn of RAK Associates, a Cleveland consulting firm.

AT&T needs morale boost

"Morale inside IBM seems to be pretty good," Kuehn says. "That contrasts sharply with AT&T, which probably has done more to destroy internal morale than anything. For a company that historically has been so good at managing people, since the time of divestiture, they've done a terrible job."

Organizational differences between AT&T and IBM are at the heart of AT&T's morale problems, according to Francis McInerny, owner of Northern Business Information, Inc., a New York market analysis firm.

"AT&T is unionized; IBM is not," McInerny says. "That means that AT&T is bound to take a harder approach when [the firm faces] a difficult situation.

"IBM's organizational strategy is extremely shrewd. They have a practice of putting up and taking down divisions with lightning speed. They reorganize their staff regularly, move them back and forth. They have trained their work force to be flexible, accepting moves halfway across the country and around the world. Only through a no-layoffs policy could they give their employees a sense of security and loyalty," he says.

"On the other hand," McInerny continues, "AT&T has gone for the most rigid solution. As a heavily unionized organization in a competitive environment, every time they reorganize, it's traumatic."

In addition, McInerny says, IBM has sold its staff on a culture of full employment from cradle to grave.

It also emphasizes common goals, even though its different divisions have dozens of different objectives. AT&T has always had a corporatewide mission and has never had the structural flexibility IBM enjoys.

> "MORALE inside IBM seems to be pretty good. That contrasts with AT&T, which probably has done more to destroy morale than anything."
>
> DICK KUEHN
> RAK ASSOCIATES

Currently, AT&T is paring down from a high-water mark of about 400,000 employees. The company's turmoil stems from overstaffing during the growth years; the extra ingredient in the firm's case, of course, was the court-ordered divestiture in 1982, which took effect at the beginning of 1984.

"In the old days, before competition," one former AT&T employee says, "our rates were held to a 12% margin, and there was no reason to do things as cheaply as possible. Hell, you could get 12% on an investment. There was an advantage to having higher costs — and more people — because pricing is a function of costs."

But the real monkey wrench was AT&T's entry into the computer market, a move as ill-fated as IBM's obverse attempt to build an alternate long-distance telephone service. AT&T is still hanging on in computers. But many observers, both inside and outside the firm, say the company must get out of the computer market, an area that has drained its resources.

"With the money they've spent on a series of losers," one ex-staffer says, "they could have bought Compaq or DEC."

Earlier this year, AT&T took steps to categorize employees eligible for early retirement. According to several sources, three groups were identified: those being laid off; those at risk ("If we don't get enough volunteers, you go"); and protected workers, who will not be offered early retirement.

The last category is a recent innovation to protect against the departure of the company's most valuable personnel. It includes, for example, many employees who possess hard-to-get security clearances.

Meanwhile, IBM employees say the voluntary early retirement program is consistent with traditional company policy.

"If IBM had to lay off people like AT&T is doing, as opposed to having them take early retirement, it would very much change the way IBM operates and the kind of place it is to work," says Richard Shaffer of Technologic Partners in New York.

IBM's full-employment policy means that now, as in other economic rough spots during the last half-century, there are no layoffs; those who leave do so willingly. IBM's most recent enticements for early retirement have convinced more than 10,000 employees to move on.

IBM is also realigning its resources. "The new IBM buzzword in 1987 is 'face time,'" one former IBM employee says. "That means face-to-face with the customer. It [the percentage of each sales agent's time spent with customers] was as bad as 30% last year. That doesn't generate sales. The company believes it should be up around 70%. What they want to do is add more people calling on the customer."

In fact, IBM let it be known in February, not long after proclaiming this "The Year of the Customer," that in an era of overall reductions, it would increase the size of its sales force by some 10%

The disappearing job

"Most reductions in staff do not affect marketing and sales," Jay Stevens of Dean Witter Reynolds, Inc. says. "The effects primarily are in manufacturing, administration and middle management. Manufacturing isn't particularly hurt, because as you keep automating factories, the trend is to need fewer workers anyway," Stevens explains.

"Of the ones who are leaving," Kuehn says, "many were just paper-shufflers reporting to each other. But it's not the people who disappeared, it's the jobs. Those jobs were unnecessary in the first place."

At IBM, an insider says, "The staff-to-sales ratio has grown to 12-to-1 — twelve staffies to every direct marketeer. That's a little overburdening. Staff is nonproduction. We think 5- or 6-to-1 is right."

The danger in IBM's method of offering early retirement across the board is that more dynamic people — who can find other jobs easily or are thinking of starting their own companies — are the ones most likely to grab the opportunity, while the low-output workers are those most likely to stay on.

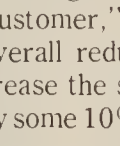
Despite their differing methods, both AT&T and IBM are expected to benefit in the long run from reducing their overheads.

"AT&T is going to be a hell of a lot more efficient than they ever were before," one former employee says. "We simply had too many people and needed to cut down in order to be more competitive."

Banker, a former columnist for *Popular Computing*, is a writer based in Washington, D.C.

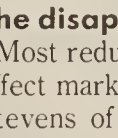
Pros and cons of early retirement and layoff policies

While layoff and early retirement policies have positive effects on a company's finances, they may also have negative effects on the employees.



Advantages

- Reduces short-term expenses
- Streamlines management
- Generates cash for the company



Disadvantages

- Erodes corporate loyalty
- Risks the loss of managerial and technical talent
- Hurts morale of those who stay

CW CHART

Bechtel forms software spin-off

BY ALAN J. RYAN
CW STAFF

ACTON, Mass. — After years of investing time and money in software development for various engineering and management tasks, the Bechtel Group, Inc. last week announced it will begin marketing software worldwide.

To handle the task, Bechtel has organized Bechtel Software, Inc., headquartered here, which it said will market four software packages to product managers and engineers in a variety of related industries.

The president of Bechtel's software spin-off will be John J. Lucas, a 20-year veteran in the field of integrated management software.

Most recently, Lucas served as executive vice-president at Project Software & Development, Inc. in Cambridge, Mass.

The San Francisco-based Bechtel Group is one of the world's largest privately held firms, with sales nearing $7 billion in 1986.

Multinational operations

Through six U.S. divisions and subsidiaries in 14 countries, Bechtel specializes in massive engineering and construction projects that include nuclear power plants and irrigation systems.

Two of President Ronald Reagan's Cabinet members — Secretary of State George Shultz and Secretary of Defense Caspar Weinberger — are former Bechtel executives.

The products Bechtel said it will market worldwide are Synergy, Walkthru, 3DM and Setroute.

Synergy was designed for project managers to help control costs, time and materials and is based on Oracle Corp.'s data base system, Bechtel said.

Walkthru reportedly allows the user to interact with existing three-dimensional computer models. It is said to work on Silicon Graphics, Inc.'s Iris workstation.

The 3DM product is a three-dimensional modeling system said to allow designers and engineers to work directly in a 3-D computer model.

Bechtel described Setroute as an interactive, menu-driven personal computer-based software system that the firm said allows electrical engineering personnel to monitor and track electrical components in a plant to be sure the parts are integrated correctly.

Rodime claims IBM patent infringement

BY JAMES A. MARTIN
CW STAFF

WASHINGTON, D.C. — In the latest round of litigation surrounding 3½-in. hard disk drive technology, Scotland-based Rodime PLC has filed a countersuit against IBM for allegedly infringing Rodime patents on its disk drives.

The countersuit, filed here, has asked that IBM be forced to cease marketing the 3½-in. 20M-byte hard disks that IBM recently began manufacturing in Japan for its Personal System/2 Models 50, 60 and 80.

The suit was filed in response to IBM's earlier lawsuit seeking to have the Rodime patents invalidated [CW, June 1].

IBM had filed its suit to prevent patent infringement suits from Rodime similar to those the Scottish disk drive maker filed against Miniscribe Corp. and Conner Peripherals, Inc. earlier this year.

IBM's lawsuit had charged that Rodime's patent is invalid and unenforceable.

A February 1986 U.S. patent reportedly gives Rodime exclusive rights to 3½-in. hard disk drive technology.

Many analysts and industry observers, however, have said they believe patents such as those are unrealistic and would not hold up under a stiff challenge.

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we never stop asking

What if...

HEWLETT PACKARD

Business Computing Systems

NCR tagged for $500,000 in software suit

BY CLINTON WILDER
CW STAFF

HONOLULU — A federal arbitrator recently ordered NCR Corp. to pay a travel services firm $504,000 in a case involving a faulty software application that NCR installed in the late 1970s.

Although NCR has paid several million dollars in damages as a result of user suits that were decided by judges or juries, this award is believed to be the largest that NCR has ever been ordered to pay in an arbitration case.

NCR's Universal Agreement, its standard equipment and services contract with customers, calls for arbitration as the means to resolve any disputes over its products or services.

Seeking payment

In last month's decision, arbitrator John W. Cater ordered the Dayton, Ohio-based vendor to pay $504,198.43 to Greeters of Hawaii, a business providing hospitality services to tourists arriving in Hawaii. NCR has not yet paid the award, and Greeters of Hawaii is seeking to have the award confirmed in federal court here.

According to the arbitrator's findings, Greeters used a turnkey system from NCR, based on an 8230 computer later upgraded to an 8250, to automate its business. Problems arose when Greeters expanded into the hotel reservations business and installed a reservations package, RES010, designed by NCR and a third-party software house.

Bugs in the application caused it to lose input orders, according to the arbitrator. He cited related problems, including file corruption, unreliable record variable length indicators, mishandling of records to be deleted and time-consuming file updating and rebuilding.

THIS AWARD is believed to be the largest that NCR has ever been ordered to pay in an arbitration case.

During the arbitration hearing, an NCR software analyst admitted that the Cobol source code of RES010 included deficient program logic and coding. The arbitrator ruled that NCR was liable for problems caused by the software bugs because providing reliable software was within the vendor's "reasonable control," the liability criterion specified in the Universal Agreement.

Took the loss

Greeters President Peter Fithian said at the hearing that he eventually had to sell the reservations business, valued at $250,000, for less than 10% of its value because the loss of computer data was detrimental to the business.

Greeters retained the hospitality services business.

The award includes $226,000 for the value of the reservations business, $95,000 for Greeters' employee time devoted to lost reservations and other charges and interest.

Genicom

CONTINUED FROM PAGE 73

the first half [of the year], we would have gone ahead with this," Ackerman said. "But it looked like it would be well into the third quarter before the credit situation would be resolved."

Ackerman noted that because the acquisition was to be recorded as a pooling of interests, the tax advantages of the merger lessened as time went on.

Will remain independent

Momentum, formed last year via a leveraged buy-out of the majority of the assets of Mohawk Data Sciences, will remain an independent company, according to Ackerman.

Momentum, which had suspended its search for a full-time chief executive during the acquisition discussions, will now actively seek one, he added.

Genicom had proposed to exchange 4.9 million newly issued shares of its common stock — valued last fall at $45 million — for all of Momentum's shares.

Genicom reportedly had hoped to strengthen its position in the lucrative computer maintenance business through Momentum.

Diversification goals

The firm also had reportedly hoped to diversify into the IBM 3270 peripherals, distributed processing and contract manufacturing businesses.

While the Centronics acquisition has been completed, Genicom is not finished looking for takeover targets, Ackerman said. Genicom intends to work off its bank debt and make another acquisition by early next year, he noted.

"It would have to be an optimal fit with what we're selling, through the same distribution channels," Ackerman said. "We would also be interested in acquiring a service company for Genicom. Cash flow is now at almost break-even, and we'll continue to work off special fees and debt."

CW Publishing names Povec president, CEO

FRAMINGHAM, Mass. — James S. Povec has been named president and chief executive officer of CW Publishing, Inc., which publishes *Computerworld*, *Computerworld Focus* and *Network World*.

Povec, 42, is the former president and CEO of CW Peterborough in Peterborough, N.H.

He will assume the day-to-day running of the operation, located here, on July 1. He said he plans to spend much of his time in the marketplace, first with readers and then with advertisers.

The position will also require close interaction between Povec and the yet-to-be-named publisher of CW and Editor in Chief Bill Laberis and his staff.

"Setting the tone and environment here at CW Publishing is also an important part of my job," Povec recently said.

A 1972 graduate of Ohio University, located in Athens, Povec entered the field of technology publishing in 1983.

James S. Povec

Before joining CW Peterborough in 1985, Povec was president and majority stockholder of Camden Communications, Inc., a Maine-based publisher of computer magazines and newsletters.

Povec is married and has four children.

Povec replaces Lee Vidmer, former president of CW Publishing, who has been named executive vice-president of planning and operations at IDG Communications, Inc.

CW Publishing and CW Peterborough are divisions of IDG Communications, which is the publishing division of International Data Group.

Promised LAN

CONTINUED FROM PAGE 73

its resellers.

Some analysts believe Chairman Howard Salwen, himself aligned with the engineering camp, has proven unwilling to hand over the Proteon reins to his marketeers.

"The company was and still is engineering-driven," The Seybold Group's White says. "Proteon has not figured out how to market its products."

Proteon stands to miss a major window of opportunity if it doesn't soon solve that riddle. It's just a matter of time before IBM decides it might be a good idea to improve the availability of its Token-Ring cards. Until then, suppliers like Proteon and Nestar have a golden opportunity. But will they take advantage of it? Some analysts are pessimistic.

Sytek and Corvus have also suffered personnel and financial losses as each has struggled to find a niche in a tough and changing market. Soured relationships with investors have added to their woes.

Bad luck in threes?

If bad luck comes in threes, then it's time for Sytek's luck to turn. The broadband vendor has been caught unaware three times this year: IBM canceled an OEM contract worth 50% of Sytek's revenue, demand unexpectedly softened in its primary market and its biggest investor put its 51% stake in the company on the block.

Most recently, Sytek laid off 14% to 20% of its employees, with a heavy emphasis on management positions.

Corvus has been battered by a succession of either poorly matched or managed mergers, an almost two-year stretch of losses and a particularly meddlesome investor. After achieving some semblance of stability, Corvus was recently gearing up to launch its latest product and a new marketing strategy when it lost its president and chief financial officer.

Nestar, which was recently purchased by DSC, a Texas outfit that one pundit claims "has no earthly business buying [Nestar]," also needs a game plan and a strong hand.

Even the market leaders need to exercise caution, analysts say. 3Com Corp., despite having a capable executive team, could nonetheless use a strong chief executive officer, White says.

And Novell, no slouch when it comes to marketing savvy, will probably announce a new president this year. At the rate Novell is vacuuming up small communications companies, a little delegation of duties is in order to make sure things don't get out of hand in Utah.

Clearly, the evolution from a start-up to a maturing company has been a painful one for many networking vendors. A one-minute manager is better than none, but some of these companies are going to need a lot more than that if they want to survive.

Networking engineers, unless they speak the marketing LAN-guage, had better make some room for the managers and marketeers out there. The alternative is playing a lonely game of king of the hill atop a pile of unsold, warehoused inventory.

Keefe is a *Computerworld* senior editor, networking.

MAI Basic Four

CONTINUED FROM PAGE 73

were up 36% on sales that grew 10%.

MAI Basic Four's business is completely in turnkey systems that bundle its 32-bit superminis and supermicros with software for customers in markets such as hotels, apparel, construction, health care and auto dealerships as well as general business.

With vendors such as IBM, Digital Equipment Corp. and Management Science America, Inc. increasingly focusing their efforts on vertical markets, MAI Basic Four said it believes, at least in the small business minicomputer market, that it already has a leg up.

"It's easy for a company to say it's going after vertical markets," said William B. Patton Jr., MAI Basic Four's president and chief executive officer.

"But I would question all the companies that say it, because it's a very difficult cultural transition for a sales force and management to make. You can't do it correctly through distributors or value-added resellers, and your direct sales force must be organized by industry, not territory," Patton said.

William Patton Jr.

Roughly 45% of MAI Basic Four's fiscal 1986 sales were to vertical rather than general-business markets, according to analyst Jean Orr of Drexel Burnham Lambert, Inc. But the company allegedly aggressively plans to increase that portion to 80% during the next five years.

MAI Basic Four has gone so far as to hire sales agents from its target industries themselves and has said it plans to open sales offices in vertically oriented venues such as apparel markets.

"We no longer hire salespeople from other computer companies on a sales-quota basis," Patton said. "We know computers; we can train them on those. We want them industry-trained by having been in one of our target industries. Most of the technical specifications, bit-slice rates and all that, are what the customers like to talk about *after* they've made the buying decision."

Patton, former president of Cado Systems Corp., was brought in by LeBow in 1985 after Cado was sold to Contel Corp. Patton spent 17 of his industry years at the former Honeywell, Inc.'s information systems unit, rising as high as vice-president of Western operations.

He currently logs a lot of frequent-flyer miles, as 50% of MAI Basic Four's product sales and 62% of its overall revenue come from outside the U.S. In fiscal 1986, nearly half of the company's business was done in Europe, with West Germany and the Netherlands alone accounting for 30%.

"The necessity of being vertically oriented has always been more paramount in Europe because of geography," Patton said.

Wall Street looks the other way

Despite MAI Basic Four's sales success, however, the company has failed so far to catch the attention of Wall Street.

Drexel Burnham is the only major investment house that regularly follows MAI Basic Four's New York Stock Exchange-listed common stock, which has generally held steady in the low to mid-teens since the firm went public last year.

"Unfortunately, we still have to overcome baggage from the past, when the company had noninvolved management and no coherent strategy," Patton said. "One of these days, our stock will start going up."

Trade gap

CONTINUED FROM PAGE 73

of the trade balance show improvement, the U.S. computer trade deficit with Japan has increased.

That gap was widened from $1 billion last year to $1.3 billion this year for the same quarterly period. Worldwide, the U.S. recorded a $700 million surplus in computer sales, compared with a $600 million surplus in the like quarter of fiscal 1986.

Worldwide, the U.S.'s total electronics deficit fell more than 19% — improving to $2.5 billion in the first quarter, compared with $3.1 billion in the 1986 quarter, according to the report.

"American companies are doing a better job trying to sell into the Japanese market," Parietti said.

He added that some 1,500 U.S. companies have used the services of the AEA office in Tokyo.

Japan encourages trade

The improvement also stems from Japan's encouragement of more trade with the U.S. The country's Prime Minister, Yasuhiro Nakasone, has encouraged Japanese companies and consumers to buy more American electronic products and other goods, Parietti said.

In other U.S. electronics trade with Japan, the largest deficit reduction in the first quarter was in consumer elecronics, which rebounded from a deficit of $2.1 billion to $1.5 billion between the first quarter of 1986 and this year.

Worldwide, the largest deficit reductions for the period were $300 million, in consumer electronics, and $200 million, in components.

EMPLOYMENT TODAY

Working abroad is no holiday

Managers weather economic, political storms to reap rewards overseas

BY CONNIE WINKLER
SPECIAL TO CW

Many MIS managers envision themselves earning vast amounts of money in some exotic locale where work is a challenge as well as an adventure.

In this day of the sinking dollar, trade deficits and terrorism, data processing managers who pursue their dreams of overseas employment may be in for a rude awakening.

However, despite the turmoil of economic and political conditions abroad, there are still many positions in foreign countries that promise lucrative rewards.

Overseas companies are seeking professionals with experience in computer systems maintenance, as well as those with training in data, voice and radio communications, according to recruiters.

Despite the instability of foreign locations, many MIS professionals are responding to the need for overseas workers because of their desire for money and excitement. In most cases, they choose to work for U.S. companies with either contracts or offices abroad.

In some countries, it is almost impossible to spend money because either everything from housing to meals is provided by the employer or foreign money is not accepted.

"You can bank almost everything you earn," says Jay Jacobson, president of Personnel Resources International, a New York-based recruiting firm.

U.S. companies must offer financial incentives to persuade Americans to volunteer for overseas work, because many professionals are reluctant to leave the familiarity of the states, says Mary C. Johnsson, a principal of Superlative Software Systems, Inc., an East Windsor, N.J., management consulting company.

"Many people go overseas for short-term assignments and save their money, and many of them come back as fairly rich men," says Johnsson, who until recently worked overseas for PA Consulting Services, Inc. in London, an international management and technology consulting firm.

Weighing pros and cons

DP professionals should take a balance sheet approach when considering an overseas move, Jacobson says. An American preparing for an overseas position should assign dollar amounts to the advantages and disadvantages and then simply add them up to get the bottom line.

While financial rewards may go on one side of the balance sheet, career issues may be on the other side, Johnsson says. "It really depends on where you are in your career. If you are going to go over there for two years or three years, what will you come back to?" she asks. "When you come back, do you have to start again, competing with younger people who have climbed the corporate ladder, or is your global experience a definite plus for your career?"

> "WHEN you come back, do you have to start again, competing with younger people who have climbed the corporate ladder, or is your global experience a definite plus for your career?"
>
> MARY C. JOHNSSON
> SUPERLATIVE SOFTWARE SYSTEMS, INC.

Another tradeoff between working here and abroad is the cultural differences that require DP professionals to adjust their ways of doing business. "Most people underestimate the adjustments required for different cultural environments," Johnsson says.

For example, when she was in London, Johnsson says, she adjusted to the English manner of making business decisions during prolonged lunches.

"In this country, you take a short lunch period and organize meetings to talk about specific business opportunities. In London, lunch is still very much regarded as a mechanism for accomplishing business," she says.

Also, Johnsson says she found that overseas companies emphasize different aspects of decision making. In the U.S., she explains, companies rely on short decision making cycles, while companies in London, Australia and especially Japan are known for protracted decision making.

"Americans place more emphasis on speaking and on presenting decisions. They focus on individual initiative," Johnsson says. "In Australia, there is less emphasis on how voluble you are. It doesn't matter if you are quiet and you don't make a dynamic physical impression, so long as your work is good."

MIS professionals who survive happily working in foreign countries are the ones who can adjust to cultural differences as well as roll with the punches, often coping with a great deal of governmental bureaucracy, Jacobson says.

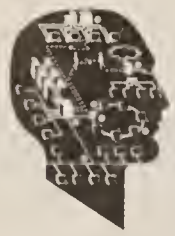
Third World lucrative

Despite the economic and political changes of overseas employment in recent years, technical professionals are still needed in the Middle East and developing Third World countries. There is less demand for them in Australia and the more glamorous, developed countries in Europe. "People always want to go to Paris, London or Rome, but that is not where the jobs are," Jacobson says.

The type of person who is raring and ready for the Third World countries is often an adventurer who is currently bored with his job. These adventurers find a variety of conditions overseas, ranging from a highly structured living and working compound environment to a situation in which they are the only Americans working for the company or even in the country.

Although recruiters emphasize they are equal opportunity employers, men are more likely to be hired for overseas jobs than women because of the cultural strictures in many of the Third World countries.

Winkler is a free-lance writer based in New York. Her latest book, *Careers in High Tech*, was published this spring by Simon & Schuster, Inc.'s Prentice-Hall Press.



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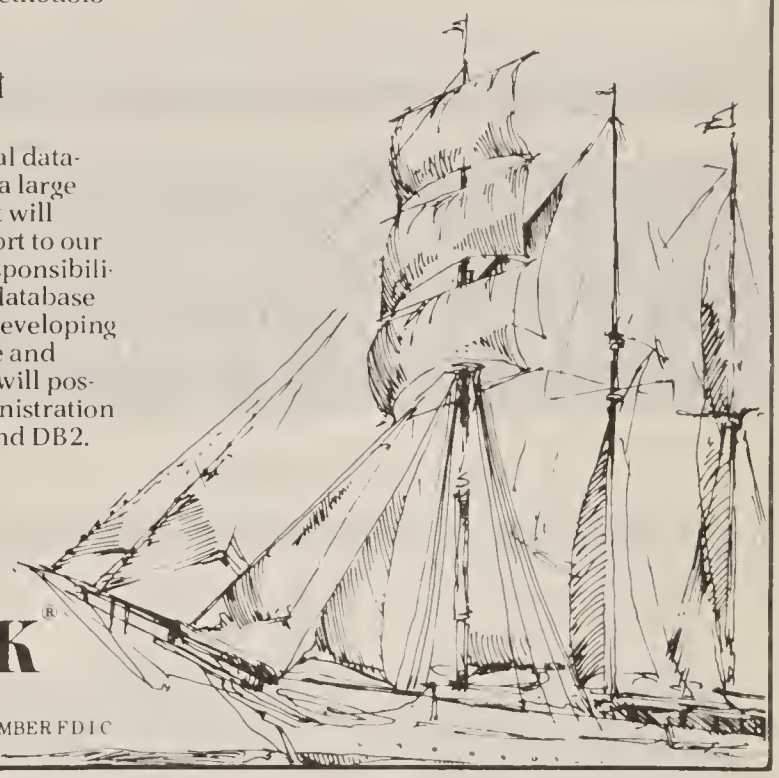

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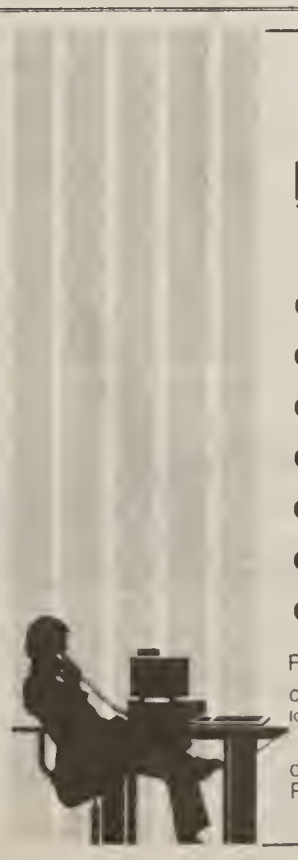

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data processing

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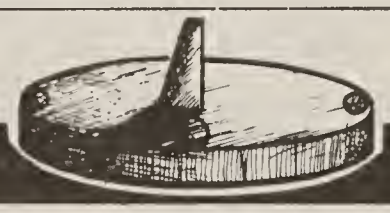

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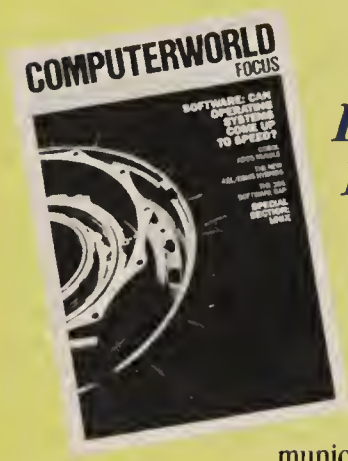

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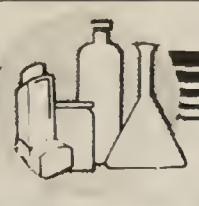

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•9375-60	0.76	8 to 16
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S/38-700	1.1	16 to 32
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4341-2	1.5	2 to 16
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5880	26.6	32 to 256
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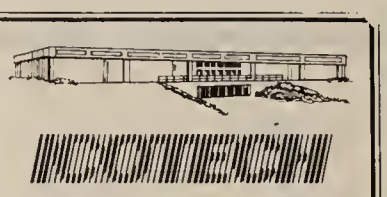

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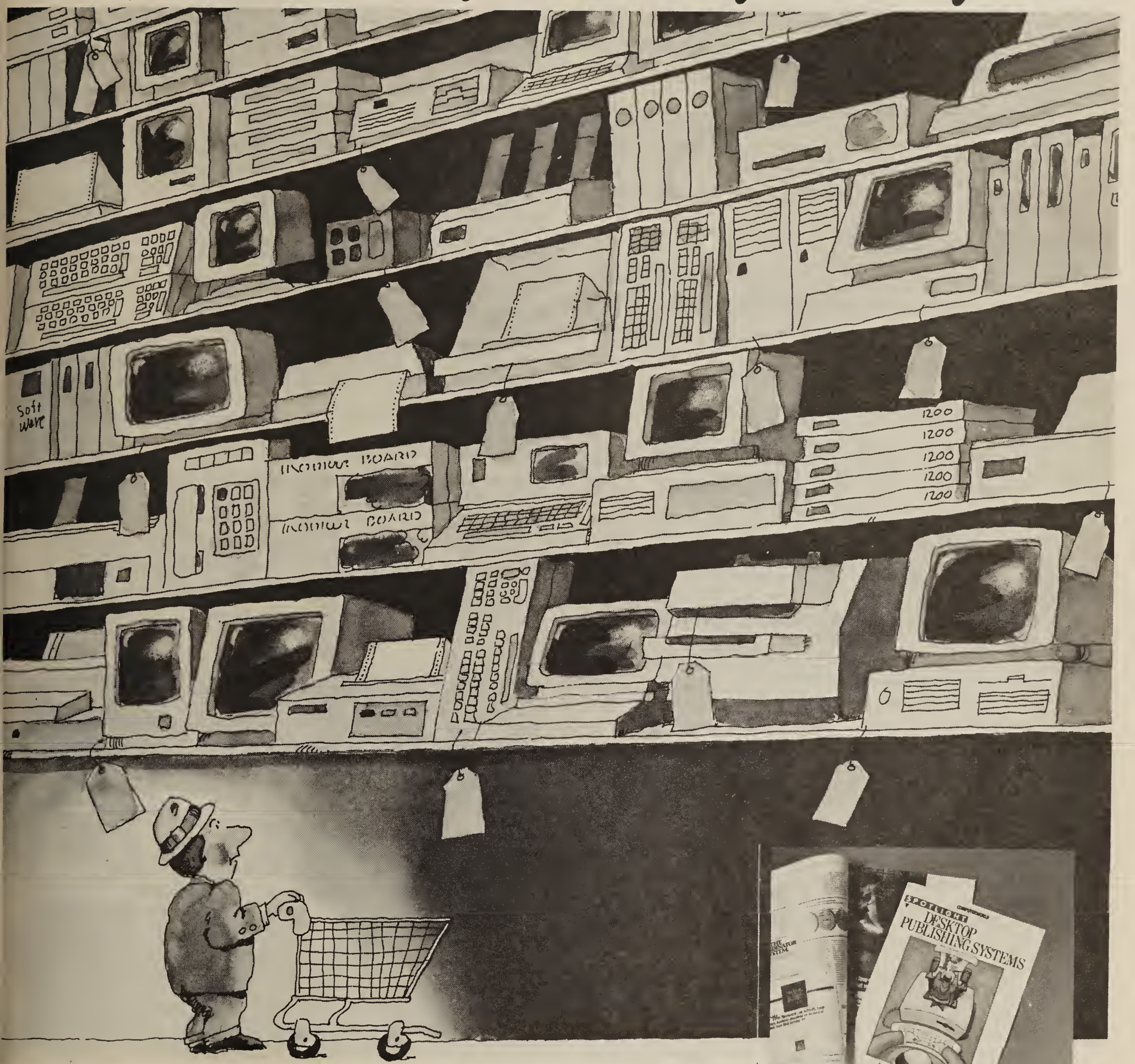

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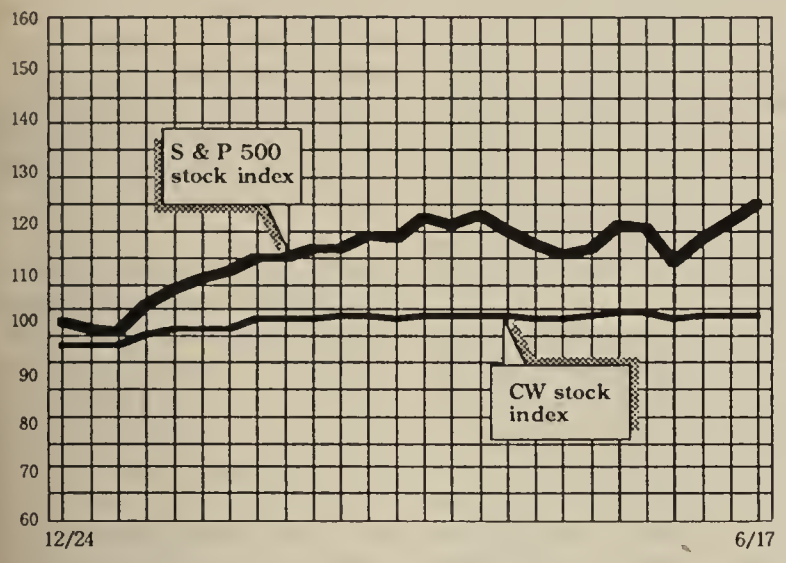

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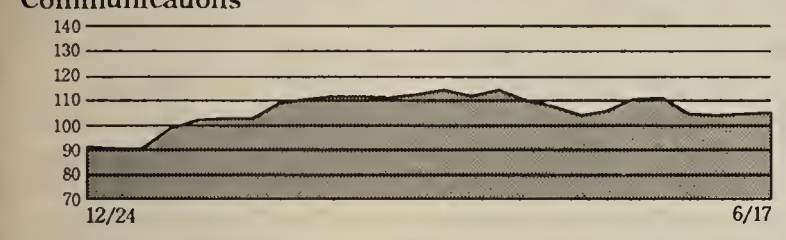

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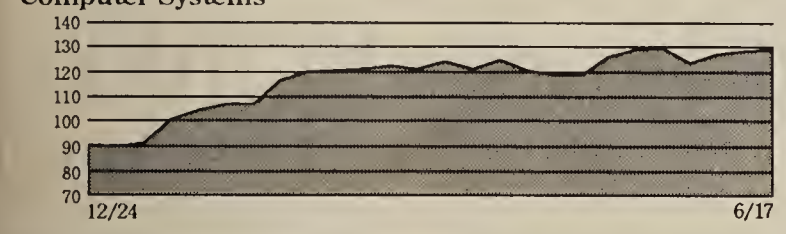

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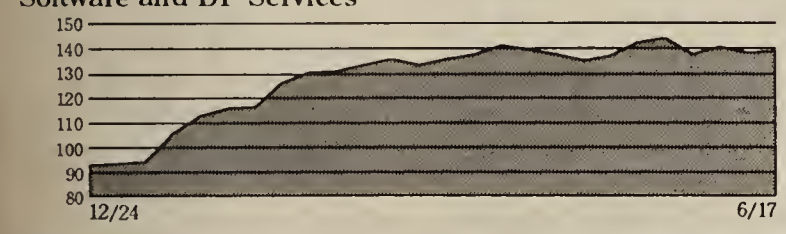

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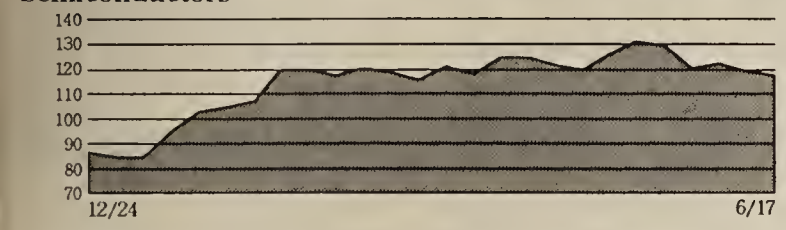
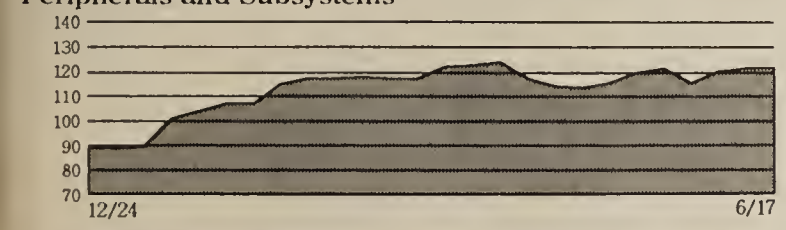
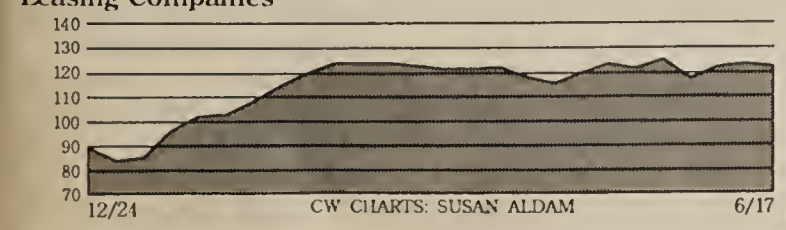


Peripherals and Subsystems



Leasing Companies



CW CHARTS: SUSAN ALDAM

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 17, 1987

EXCH		52-WEEK RANGE (1)		CLOSE JUNE 17 1987	WEEK NET CHNGE	WEEK PCT CHNGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	101	77	86.88	+2.3	+2.7
Q	ANDREW CORP	19	14	15.00	+0.0	+0.0
Q	ARTEL COMM CORP	6	2	2.75	-0.1	-4.3
N	AT&T	28	22	27.75	+1.8	+6.7
Q	AVANT GARDE COMP INC	7	3	3.38	-0.4	-10.0
Q	AVANTEK INC	19	13	16.50	-0.4	-2.2
N	AYDIN CORP	38	18	34.25	+1.0	+3.0
N	BELL ATLANTIC CORP	77	62	70.38	+2.8	+4.1
N	BELLSOUTH CORP	46	35	41.00	+1.4	+3.5
Q	BRIDGE COMMUNICATION	27	11	22.38	-2.3	-9.1
Q	COMPRESSION LABS INC	14	4	4.50	-0.4	-7.7
O	COMPUTER NETWORK TECH	9	4	4.44	-0.3	-6.6
N	CONTEL CORP	35	27	32.50	+1.5	+4.8
Q	DATA SWITCH CORP	9	5	7.00	-0.4	-5.1
Q	DIGITAL COMM ASSOC	49	16	35.25	-1.0	-2.8
Q	DYNATECH CORP	44	27	32.25	+0.0	+0.0
Q	EQUATORIAL COMM CO	9	2	3.13	+0.1	+4.2
Q	GANDALF TECHNOLOGIES	11	5	9.00	-0.3	-2.7
Q	GENERAL DATACOMM INDS	14	8	10.50	-1.1	-9.7
N	GTE CORP	43	33	39.25	+1.3	+3.3
Q	INFOTRON SYS CORP	16	7	10.38	+0.4	+3.8
N	ITT CORP	66	44	58.88	+0.5	+0.9
N	M A COM INC	18	12	13.25	+0.3	+1.9
Q	MCI COMMUNICATIONS CORP	11	5	7.13	+0.6	+9.6
Q	MICOM SYS INC	18	10	15.38	-0.4	-2.4
Q	NETWORK SYS CORP	19	9	10.38	+0.5	+5.1
N	NORTHERN TELECOM LTD	23	13	20.25	+0.4	+1.9
Q	NOVELL INC	27	9	22.50	+1.3	+5.9
N	NYNEX CORP	73	59	70.75	+3.6	+5.4
N	PACIFIC TELESIS GROUP	31	23	26.38	+0.9	+3.4
N	PARADYNE CORP	10	4	6.88	+0.6	+10.0
A	PENRIL CORP	8	4	4.50	+0.3	+5.9
N	PLESSEY PLC	41	24	36.75	+1.0	+2.8
N	SCIENTIFIC ATLANTA INC	19	9	18.00	+0.4	+2.1
N	SOUTHWESTERN BELL CORP	41	33	39.50	+2.0	+5.3
Q	3 COM CORP	24	9	16.25	-1.4	-7.8
N	TIMEPLEX INC	41	14	34.13	-0.9	-2.5
Q	UNGERMANN BASS INC	16	7	13.88	-0.8	-5.1
N	U S WEST INC	62	45	53.00	+2.4	+4.7
	Computer Systems					
Q	ALLIANT COMPUTER SYS	37	16	31.75	-1.0	-3.1
Q	ALPHA MICROSYSTEMS	7	3	3.63	+0.2	+5.4
Q	ALTOS COMPUTER SYS	17	10	11.50	-0.4	-3.2
A	AMDAHL CORP	42	16	37.50	+0.4	+1.0
Q	APOLLO COMPUTER INC	25	9	22.50	-1.5	-6.3
S	APPLE COMPUTER INC	43	15	40.50	+1.3	+3.2
N	BOLT BERANEK & NEWMAN	60	37	44.38	+1.1	+2.6
Q	BRITTON LEE INC	7	4	3.88	-0.3	-6.1
N	COMPAQ COMPUTER CORP	51	12	43.88	-2.9	-6.1
Q	COMPUTER AUTOMATION INC	17	2	12.75	+0.0	+0.0
A	COMPUTER CONSOLES INC	12	7	9.88	+0.1	+1.3
Q	CONCURRENT COMP CORP	19	11	16.75	-0.5	-2.9
N	CONTROL DATA CORP DEL	35	20	28.88	+0.3	+0.9
Q	CONVERGENT TECH	12	4	7.50	-0.5	-6.3
Q	CONVEX COMPUTER CORP	22	8	17.25	-0.1	-0.7
N	CRAY RESH INC	136	69	103.75	+2.8	+2.7
Q	DAISY SYS CORP	13	8	8.13	-0.5	-5.8
N	DATA GEN CORP	39	25	34.13	-1.0	-2.8
N	DATAPOINT CORP	9	4	7.13	+0.4	-5.6
N	DIGITAL EQUIP CORP	175	81	166.75	+3.0	+1.8
N	FLOATING POINT SYS INC	39	9	9.88	-0.4	-3.7
N	GOULD INC	23	15	18.88	+1.4	+7.9
N	HARRIS CORP DEL	43	27	37.25	+0.8	+2.1
N	HEWLETT PACKARD CO	67	36	62.88	+0.4	+0.6
N	HONEYWELL INC	84	58	80.50	+0.8	+0.9
N	IBM	168	116	161.38	+3.6	+2.3
Q	INFORMATION INTL INC	18	13	13.75	+0.3	+1.9
Q	IPL SYS INC	4	2	2.88	+0.0	+0.0
Q	MASS COMPUTER CORP	10	5	8.63	+0.8	+9.5
N	MATSUSHITA ELEC INDL LTD	143	77	139.50	+10.5	+8.1
Q	MEGADATA CORP	7	2	5.63	-0.4	-6.3
Q	MENTOR GRAPHICS CORP	34	11	27.88	-1.5	-5.1
N	NBI INC	14	8	12.25	-0.3	-2.0
N	NCR CORP	78	42	75.75	+0.8	+1.0
N	PRIME COMPUTER INC	30	16	25.75	-0.8	-2.8
Q	PYRAMID TECHNOLOGY	11	4	11.25	+0.9	+8.4
Q	STRATUS COMPUTER	41	18	38.75	+1.3	+3.3
Q	SUN MICROSYSTEM INC	46	11	41.13	-2.5	-5.7
Q	SYMBOLICS INC	12	4	4.25	+0.1	+3.0
S	TANDEM COMPUTERS INC	38	14	33.00	-0.4	-1.1
N	TANDY CORP	56	31	43.75	+2.9	+7.0
N	ULTIMATE CORP	30	13	27.75	+2.5	+9.9
N	UNISYS CORP	125	60	120.75	+1.0	+0.8
A	WANG LABS INC	19	11	16.88	+0.0	+0.0
	Software & DP Services					
Q	ADVANCED COMP TECH	6	3	4.00	-0.4	-8.6
N	ADVANCED SYS INC	24	12	23.38	+0.9	+3.9
N	AGS COMPUTERS INC	22	8	18.00	-1.6	-8.3
Q	AMERICAN MGMT SYS INC	19	7	17.75	-1.0	-5.3
Q	AMERICAN SOFTWARE INC	22	7	15.88	-0.4	-2.3
N	ANACOMP INC	9	3	8.88	+0.8	+9.2
Q	ANALYSTS INTL CORP	11	4	9.25	+0.0	+0.0
Q	ASHTON TATE	30	10	24.50	+1.1	+4.8
Q	ASK COMPUTER SYS INC	17	9	12.75	-0.3	-1.9
Q	AUTODESK INC	285	8	25.25	+1.5	+6.3
N	AUTO DATA PROCESSING	51	29	49.63	+0.6	+1.3
Q	BOOLE & BABBAGE INC	11	4	10.25	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	29	10	25.25	-0.8	-2.9
Q	COMPUTER HORIZONS CORP	15	10	12.63	-0.1	-1.0
N	COMPUTER SCIENCES CORP	61	30	57.13	+1.6	+2.9
N	COMPUTER TASK GROUP INC	18	11	13.00	-0.5	-3.7
Q	COMSHARE INC	28	11	25.50	+5.8	+29.1
N	CULLINET SOFTWARE INC	14	6	11.75	-0.5	-4.1
Q	CYCARE SYS INC	16	7	7.63	-0.3	-3.2
Q	DUQUESNE SYS INC	33	12	24.50	-1.3	-4.9
Q	ENDATA INC	11	5	10.63	+0.6	+6.3
N	GENERAL MTRS (CLS E)	49	24	41.50	-0.5	-1.2
Q	HOGAN SYS INC	17	9	14.75	-0.8	-4.8
Q	INFORMIX CORP	23	7	18.00	-1.3	-6.5
Q	INTELLICORP INC	11	4	9.75	+0.0	+0.0
Q	KEANE INC	16	5	8.75	-0.5	-5.4
Q	LOTUS DEV CORP	37	9	31.25	+1.0	+3.3
Q	MANAGEMENT SCI AMER	21	12	13.75	-0.9	-6.0
Q	MICRO PRO INTL CORP	8	2	6.25	-0.1	-1.0
Q	MICROSOFT CORP	128	26	103.75	+0.3	+0.2
Q	NATIONAL DATA CORP	27	16	22.38	+1.8	+8.5
Q	ON LINE SOFTWARE INTL INC	20	6	18.00	-0.9	-4.6
Q	ORACLE SYS CORP	30	7	25.00	-1.0	-3.8
N	PANSOPHIC SYS INC	23	12	22.00	+0.1	+0.6
Q	POLICY MGMT SYS CORP	30	15	27.50	+3.8	+15.8
Q	PROGRAMMING & SYS INC	13	8	10.38	-0.1	-1.2
Q	REYNOLDS & REYNOLDS CO	42	27	33.25	-2.3	-6.3
Q	SEI CORP	35	15	31.75	+0.0	+0.0
Q	SHARED MED SYS CORP	53	23	26.88	+0.1	+0.5
Q	SOFTWARE AG SYSTEMS INC	20	10	12.50	+0.5	+4.2
Q	SOFTWARE PUBG CORP	17	5	11.00	+0.8	+7.3
A	STERLING SOFTWARE INC	21	9	10.75	+0.1	+1.2
Q	SUNGARD DATA SYS INC	21	10	17.25	-1.3	-6.8
Q	SYSTEMATICS INC	30	14	26.75	-1.0	-3.6
N	UCCEL CORP	45	18	41.63	-0.5	-1.2
N	URS CORP	21	13	17.50	+1.4	+8.5
Q	VM SOFTWARE INC	45	16	26.75	+1.8	+7.0
	Semiconductors					
N	ADV MICRO DEVICES INC	25	13	20.00	1.3	5.9
N	ANALOG DEVICES INC	24	14	20.00	0.5	2.4
Q	ANALOGIC CORP	13	10	11.13	+0.0	+0.0
Q	INTEL CORP	48	16	42.50	+0.3	+0.6
Q	LSI LOGIC CORP	17	8	11.38	0.4	3.2
Q	MONOLITHIC MEMORIES INC	19	10	17.00	-0.9	-4.9
N	MOTOROLA INC	64	34	56.63	+2.1	+3.9
N	NATL SEMICONDUCTOR	17	8	13.13	-0.4	-2.8
S	TEXAS INSTRS INC	68	34	60.25	+2.0	+3.5
A	WESTERN DIGITAL CORP	33	11	26.38	-1.4	-5.0
	Peripherals					
N	AM INTL INC	9	5	7.38	+0.5	+7.3
Q	AST RESH INC	23	11	16.00	-1.5	-8.6
Q	AUTO TROL TECH CORP	9	3	7.13	+0.3	+3.6
Q	BANCTEC INC	16	6	13.63	-1.1	-7.6
Q	CIPHER DATA PRODS INC	18	10	12.00	0.6	-5.0
A	COGNITRONICS CORP	5	2	4.63	+0.3	+5.7
N	COMPUGRAPHIC CORP	24	16	22.00	-0.4	-1.7
N	COMPUTERVISION CORP	23	10	15.75	-0.6	-3.8
N	CONRAC CORP	30	12	27.25	+0.0	-0.0
A	DATAPRODUCTS CORP	17	10	11.88	+1.1	+10.5
A	DATARAM CORP	11	7	7.25	-0.4	-4.9
N	DECISION INDS CORP	15	7	9.25	+0.0	+0.0
N	EASTMAN KODAK CO	88	52	87.63	+5.9	+7.2
Q	E M C CORP MASS	34	11	27.75	+0.8	+2.8
Q	EMULEX CORP	10	5	8.00	+0.0	+0.0
Q	EVANS & SUTHERLAND	40	20	31.50	+1.3	+4.1
Q	ICOT CORP	13	5	6.75	-0.4	-5.3
Q	INTERLEAF INC	20	8	18.88	+0.9	+4.9
Q	IOMEGA CORP	13	2	2.50	-0.5	-16.7
Q	LEE DATA CORP	10	5	7.38	+0.8	+11.3
Q	MASSTOR SYS CORP	5	2	4.25	-0.3	-5.6
Q	MAXTOR CORP	34	10	21.13	-7.9	-27.2
Q	MICROPOLIS CORP	44	14	36.88	3.9	-9.5
Q	MINISCRIBE CORP	18	5	16.13	+0.3	+1.6
S	MINNESOTA MNG & MFG CO	70	50	69.38	+2.9	+4.3
A	MSI DATA CORP	18	10	17.63	+1.4	+8.5
Q	PRIAM CORP	5	2	4.88	+0.4	+8.3
Q	PRINTRONIX INC	14	10	12.25	+0.3	+2.1
N	QMS INC	18	11	16.88	+0.4	+2.3
Q	QUANTUM CORP	35	16	20.00	-2.3	-10.1
Q	RAMTEK CORP	6	4	5.00	+0.3	+5.3
N	RECOGNITION EQUIP INC	27	10	21.63	+1.8	+8.8
Q	REXON INC	14	5	10.25	-0.3	-2.4
Q	SCAN TRON CORP	19	11	11.75	+0.3	+2.2
Q	SEAGATE TECHNOLOGY	46	10	38.50	-1.5	-3.8
N	STORAGE TECH CORP	5	2	4.13	+0.0	+0.0
Q	TANDON CORP	7	2	5.75	-0.3	-4.2
A	TEC INC	7	3	6.38	+1.9	+41.7
N	TEKTRONIX INC	43	27	37.75	+0.1	+0.3
Q	TELEVIDEO SYS INC	3	2	2.50	+0.0	+0.0
N	TELEX CORP	102	52	74.50	-4.3	-5.4
Q	WYSE TECH	35	13	27.13	-4.1	-13.2
N	XEROX CORP	81	49	80.00	-1.6	-2.1
Q	XIDEX CORP	21	12	12.50	+0.0	+0.0
	Leasing Companies					
N	COMDISCO INC	33	15	30.25	-0.4	-1.2
N	CONTINENTAL INFO SYS	14	7	12.75	-0.3	-1.9
Q	PHOENIX AMERN INC	8	3	4.75	-0.1	-2.6
Q	SELECTERM INC	8	5	5.38	+0.0	+0.0
N	U S LEASING INTL	53	38	51.25	+0.3	+0.5

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL; O = OVER-THE-COUNTER; S = SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Buying craze

Aldus goes public, makes big splash on Wall Street

The stock market appeared starved for a hot new computer offering, and Seattle-based desktop publishing software firm Aldus Corp. reaped the benefit in a big way.

On its first day of trading as a public company last Tuesday, Aldus soared from its initial offering price of 20 to 35¾ in frenzied trading of 3.3 million shares. Aldus was not only the most active over-the-counter stock; it trailed only AT&T in the number of shares traded on any exchange that day. Aldus's first trade of the day was at 27.

On Wednesday, the buying craze subsided as Aldus dropped 1 point to 34¾ on a volume of 800,000 shares. At the end of Thursday, Aldus closed down 2 points at 32¾.

Sharing investors' desktop publishing enthusiasm was Adobe Systems, Inc., which gained 5 points on Tuesday to 36½. Adobe sustained the rally with a 1½-point rise Wednesday. In Thursday's trading, Adobe closed at 37½, down ½ point. Adobe has traded as high as 56 in the past year.

IBM rose 2⅜ points Tuesday to 162 after announcing a raft of communications enhancements. IBM began the week at 156⅝ and closed Thursday at 160⅞.

CLINTON WILDER

Solutionpacs spread to nets

BY ALAN ALPER
CW STAFF

NEW YORK — Two products introduced last week by IBM, to be marketed as Solutionpacs, aim to help customers quickly install network management and mid-range processor products, the company said.

IBM also brought out updated versions of its office series of Solutionpacs for VM systems and the System/36.

The network management package, called Netview Implementation, consists of IBM's Netview Release 1 software and services said to accelerate the installation of the program on a host processor controlling a Systems Network Architecture network. Services include: planning, installation, testing and migration, if required; and customer education.

"A Netview Implementation Solutionpac is the first of several offerings we're planning to help customers install Netview releases and build their network management systems," said Ellen Hancock, an IBM vice-president and president of the Communication Products Division.

Netview-based

A Solutionpac based on Netview Release 1 is currently available for MVS/370 and MVS/Extended Architecture (XA) environments and will be released on July 31 for VM systems, IBM said. The Solutionpac based on Netview Release 2 reportedly will be available concurrent with the program's release. Availability schedules are as follows: MVS/XA and MVS/370 in the fourth quarter, VM in first-quarter 1988 and VSE in fourth-quarter 1988.

One-time charges for the Netview Solutionpac for MVS/XA systems, depending on the processor class, range from $50,450 to $73,040. For VM machines, the one-time charge runs from $21,820 to $48,895, depending on the processor class. Distributed-system license fees run from $19,565 to $39,870 on VM systems to $41,030 to $57,965 on MVS/XA systems.

Under terms of the Solutionpac contract, after selecting the appropriate hardware and software, customers must designate a project administrator to oversee all network management operations and appoint a technical person to operate the target system and facilities for IBM personnel.

IBM also unveiled a Solutionpac, called Site Planning Services, intended to help customers plan to accelerate the installation of 9370, Series/1, System/34, 36 and 38 and System 88 processors and related equipment.

Prices depend on the number of sites, services selected and types of equipment involved, IBM noted.

IBM

FROM PAGE 1

9370 can run unattended, IBM said. For example, a 9370 running Netview 2 can contact a Netview host as soon as it is booted up so that its address and configuration is added automatically to the Systems Network Architecture (SNA) table, IBM said.

This second capability complements another announced capability, one that has been long awaited by MIS managers: dynamic path update and table replacement for VTAM SNA networks. Computers and communications controllers can now be added, deleted and relocated, and routes can be changed on the network without taking it down, according to Ellen Hancock, president of IBM's Communication Products Division.

Management skills

A 9370 running Netview 2 becomes a local network management node that can collect network alerts from a group of workstations attached to it either directly or via a local-area network (LAN). MIS can use the Netview Command List utility to develop programs that automatically download configuration changes to a 9370, which then implements them on the LAN it controls locally.

Netview Release 2 is a more automated, less expensive version of Netview targeted at small, remote sites that cannot cost-justify a technical operator, according to Hancock.

The Inter-System Control Facility (ISCF), also announced last week, is said to allow a centralized host to perform warm starts, time-of-day clock setting, system initialization, system recovery and hardware and software monitoring for remote target systems.

IBM also announced Netview/PC Version 1.1, which it said supports Netview Release 2 and can forward generic alerts on to Netview hosts. By defining a generic alert format, IBM hopes to standardize "alert reporting and procedures to correct problems, eliminating the need to maintain a library of product-specific descriptions and panels," the vendor said.

IBM said Netview Release 2 for MVS systems will be available in the fourth quarter. The PC Target version of the system is scheduled to be released at the same time. The VM version is scheduled for first-quarter 1988 release; the VSE version in the fourth quarter of 1988.

The Netview Release 2 MVS/XA version is priced between $37,650 and $60,240. The VM version is priced between $9,020, for the Group 10 processors, and $36,095, for the Group 40 processors. The VSE version is priced between $7,860 and $31,400.

IBM said ISCF runs on MVS/XA, MVS/370 and VM systems. It is priced at $7,000 and should be available for MVS/370 and MVS/XA in the fourth quarter. It is scheduled to be available for VM in the first quarter of 1988. ISCF/PC is priced at $1,500 and is set to ship in the fourth quarter.

Other network management-related packages released by IBM include the following:

• The Netview Network Definer, a menu-driven, interactive application that facilitates network management. The program is said to automatically generate ACF/VTAM definitions for local SNA and non-SNA devices plus a variety of communications subsystems and can create a set of paths that can be used to establish sessions among hosts. Slated to be available in December, the Netview Network Definer is priced between $2,240 and $8,960.

• The SNA Application Monitor, among several releases designed to extend Netview control to the application level, is said to enable terminals to display the status of all VTAM applications within a network and to connect to individual applications. Also in this category is Netview/Access, which the vendor said controls user access to a given application based on profile information. Both are scheduled to be available in December.

• The new Version 3 Release 2 of Advanced Communications Function for VTAM is said to provide support for Low-Entry Networking (LEN) — a peer-to-peer architecture that incorporates the LU6.2 protocols to connect applications and the PU2.1 protocols to connect physical devices. IBM also announced that the Network Control Program, which runs on communications processors such as the 3725, now supports PU2.1 type nodes. As a result of these announcements, VTAM hosts can now support both the hierarchical SNA environment and peer-to-peer networking, Hancock said. IBM also added LEN support to the Series/1.

• The IBM 3737 Channel-to-Channel Unit allows an IBM 4300, 3080, 3090 or 9370 mainframe to communicate with another host via a 1.5M bit/sec. T1 line over unlimited distances and will be available in November.

Communications enhancements specific to the 9370 include the following:

• LU6.2 support for Transparent Services Access Facility, a 9370-specific software package that provides a single data base view across a cluster of up to eight 9370s.

• CCITT X.25 support for a 9370 VTAM system through a direct link to the 9370's Internal Communications Adapter.

• 9370 support of dial-up and multidrop links to SNA nodes.

• VTAM Token-Ring LAN Communications Adapter support for a 9370 VM system.

3270 line lengthened

Family of ASCII terminals also unveiled by IBM

BY ALAN ALPER
CW STAFF

NEW YORK — IBM last week moved to tighten its stranglehold on the 3270 peripherals market, unveiling a family of full-functioned displays and enhancements for its 3174 cluster controller.

At the same time, the company took an aggressive stance in the ASCII terminals market, introducing a family with an entry-level price of $399.

The new 3270 terminals extend the full functionality of IBM's displays technology across the firm's product line, an IBM spokesman said.

"They've made a statement that they're still in the 3270 business and do intend to control the market by introducing competitively priced products," noted Eileen O'Brien, an analyst at market research firm International Data Corp. in Framingham, Mass "Good luck to people who are still left in the market and who have to respond."

Among the 3270 terminals introduced were two entry-level 14-in. displays, the 3191 Models D and E. The terminals have the same features as current Models A and B but offer a printer port for the IBM Proprinter and a record/play/pause feature to store up to 1,500 characters of frequently used names or phrases.

Set to be available next month, the two terminals will cost $1,425 with a one-year warranty and $1,525 with a three-year warranty.

The 3091 Model L is a 14-in. green display that adds optional light-pen support. Slated to be available in August, it will be priced at $1,795 and $2,065, including a one-year or three-year warranty, respectively.

The 3192 Model 5 is a 14-in., seven-color terminal with a local printer port and the record/play/pause capability found on the 3091. It will list for $2,095 and $2,245, depending on warranty, and is scheduled to be available next month.

The 3194 — the high-end family member — is slated to be offered with 640K bytes of memory and a 2M-byte floppy disk drive. An option will allow the terminal to function concurrently with Systems Network Architecture or ASCII hosts, according to IBM.

The 3194 is slated to be offered in three models with a choice of keyboards and monitors. Prices will range from $2,495 to $2,895, with availability set for August.

IBM to sell NET IDNXs

BY STANLEY GIBSON
CW STAFF

Following months of speculation that a deal was in the works, IBM last week announced it will sell and service the three models of Network Equipment Technologies Corp.'s (NET) Integrated Digital Network Exchange (IDNX) T1 multiplexers.

In addition, IBM will contribute an undisclosed amount to the funding of future NET products, and the two companies will work jointly on product development, according to Stan DeVaughn, NET spokesman. IBM will not obtain NET stock in exchange, DeVaughn added.

For the present, NET's products will be sold under the NET label by IBM, although IBM acquired the right to sell them under its own label in the future. In exchange for its funding contributions, IBM has the right to sell all NET products.

IBM will offer the IDNX Models 20, 40 and 70. Models 40 and 70 are scheduled to be available in November; Model 20 in the first quarter of 1988. The IDNX 20 was announced this month by NET and is scheduled to be delivered by NET late in the fourth quarter.

All IDNXs perform the same functions, but the three models are of different sizes, serving different numbers of lines at prices ranging from $25,000 to more than $450,000.

NET was among the first vendors to support Netview/PC.

Timeplex, Inc. is expected to announce next week a high-end T1 switch that will compete head-on with NET's high-end IDNX equipment.

New VM/IS a drop-in package

Upgrades ease installation and use, also aimed at spurring 9370 sales

BY JEAN S. BOZMAN
CW STAFF

IBM's VM/IS has been enhanced to make installation and use easy — and to spur sales of the company's 9370, IBM executives said last week.

VM/IS Release 5, announced Tuesday, is based on VM/SP Release 5. But IBM programmers have added features, provided a user-friendly interface and created a menu-driven installation procedure that will aid first-time VM users.

"It isn't that greatly changed from Release 4, but it is a drop-it-in VM/SP with additional products," said Robert Kusche, president of VM/Assist, a San Francisco consulting firm. Release 4 was the initial VM/IS introduced with the 9370 last fall.

"VM/IS is our prepackaged VM for small sites," said Ellen Hancock, president of IBM's Communication Products Division in Raleigh, N.C. The operating system includes new support for IBM's Systems Network Architecture (SNA) that will allow central-site MIS managers to participate more closely in system support of remote 9370 and IBM 4300 systems, IBM said.

Allows distribution

One of these features is IBM's VM/Distributed Systems Node Executive (VM/DSNX), which reportedly will be available in the second quarter of 1988. IBM said VM/DSNX will give MIS management the ability to distribute software to all locations from the central data center. More dramatically, it provides the ability to install the new software programs with "minimal or no action by systems administrators or systems programmers at the remote locations," IBM said.

"We have taken all the function of VM and distributed the same applications down to departments and end users," said Donald R. Friedman, director of plan development and product introduction for IBM's System Products Division.

Kusche said the VM/IS should boost 9370 sales. "The idea is that you won't need a systems programmer because the 9370 almost costs less than the systems programmer. We'll be paying $66,000 for our Model 20," he said.

In the new release, VM/IS Base has been given greater system control, graphics support and system administration. VM/IS now has improved SNA support, as well as an expanded office data base management system, IBM said. An additional set of enhancements will be announced in the second quarter of 1988, IBM said in a customer letter, to support related products announced last week. Among the projected enhancements are support for IBM's ACF/VTAM Version 3 Release 1.2, Netview Release 2.0 and Netview Network Definer Release 1.

Want simplification

The VM/IS changes were made largely on user requests for simplified VM procedures, Friedman explained. "We surveyed all VM/SP customers, and they told us that, right now, they have to install 28 related products and packages just to get VM/SP up and running," he said. With VM/IS Release 5, installation should take half a day at most, Friedman said, something that could favor multiple installations of 9370s throughout a customer's enterprise.

"VM/SP was certainly friendly, but you had to know what you were doing to install it. Now, IBM will be shipping a preconfigured system, VM/IS, so you can plug in your hardware and your software. The person who's going to install this will no longer be a DP professional," said Romney White, president of VM/CMS Unlimited, Inc. in Boston. "It will certainly not be a systems programmer and might even be a secretary or administrative assistant."

One of the ease-of-use features is the VM/IS Productivity Facility (VM/IS-PF) Release 5, which is a full-screen menu-driven facility that provides users with a window on system applications. It provides Help menus, and selection menus. VM/IS-PF's functionality was built into the older VM/Base product, IBM said, but IBM now allows users to order it separately.

Upgrade potential

IBM wants to put thousands of 9370s in its installed base and this year will install from 6,000 to 7,000 units worldwide, industry consultants said. In the future, the users will upgrade to high-end 370 machines.

Michael Forster, group marketing director of mid-range systems management at IBM's Information Systems Group, confirmed this notion, saying, "I want to emphasize that the 9370 is the entry point to 370 architecture, giving users a performance range of 160-fold from the 9370 to the 4381 and the IBM 3090."

Users may install VM/IS if they have at least 4M bytes of main memory in their 9370 or 4300 processor, according to IBM. Software requirements include the use of VS Fortran, VM/IS Base and SQL/DS (for SQL applications only.)

Prices for VM/IS Release 5 one-time license fees range from $28,200 for a low-end 9370 up to $106,620 for a high-end IBM 4381. There is also a monthly license charge of $2,381. General availability is scheduled for July 10, while a migration aid from VM/IS Release 4 reportedly will be available in August. VM/DSNX is priced at $2,880 for a low-end 9370 up to $$11,520 for a high-end 4381. It carries a monthly license fee of $240.

Senior writer Rosemary Hamilton contributed to this report.

IBM simplifies volume procurement

BY STANLEY GIBSON
CW STAFF

RYE BROOK, N.Y. — In an attempt to lighten the paperwork blizzard that can bury customers buying hardware and software products in quantity, IBM last week said it has simplified its Volume Procurement Amendments (VPA) and eliminated separate transportation charges for its products.

Together, the changes reduce by more than 50% the number of contracts and supporting documents necessary to purchase products in quantity, according to IBM.

Although the reduced documentation may make it easier in some cases to qualify for discounts, an IBM spokesman said the main purpose was not to increase customer savings but to reduce paperwork.

"For most customers, there will be no overall change in discounts. The purpose was to make contracts simpler and decrease paperwork for customers," the spokesman said.

IBM said it consolidated several terms that were previously repeated on a number of documents into one document.

After signing an overall VPA contract, customers then need only sign a one-page addendum to make volume commitments for one or more products.

Customers will also be able to choose a 12-, 18- or 24-month VPA contract length for certain products that previously could be purchased in volume for a fixed period only.

Storage devices, however, will continue to come with a fixed 36-month contract length, according to IBM.

Distributed

FROM PAGE 1

backbone SNA network during weekends. As usage volume increases, we need to do our reconfigurations in real time," stated Michael Radlick, director of planning and development for the New York State Education Department.

Another welcome IBM introduction was support of peer-to-peer SNA networking for a new release of the Advanced Communications Function for VTAM.

These communications enhancements are crucial to IBM's proposal of a distributed network management scheme that combines the newly extended peer-to-peer networking architecture with SNA's traditional hierarchical structure. The keystone of this architecture is an unattended 9370 that communicates with a centralized network management system.

Role in education

The renovated 9370 could play a crucial role in the networking plans of the New York Education Department, which is already evaluating the system as a departmental processor for local school districts. "But we want central control so we can do a lot of maintenance and management without having to go out to the sites," Radlick said.

Several of last week's introductions were designed to increase the 9370's viability in this role.

"The 9370 came out of the box naked as a baby; now, it's starting to grow up and sprouting software in the process," said Frank Dzubeck, president of Washington D.C., consulting firm Communications Network Architects, Inc.

Introduced as a distributed system, the 9370 garnered much criticism for its inability to do peer-to-peer SNA networking. With the announcement of LU6.2 and PU2.1 under VTAM, as well as LU6.2 support for VM/TSAF, IBM has managed to fix this problem just a month before the 9370's new July shipping date. And the newly released Netview Release 2 converts the 9370 into a satellite node in a distributed network management system.

For small sites

Designed for unattended operations, Netview Release 2 lacks many of the commands and interfaces used by a local operator in a traditional Netview system. This helped IBM price the package for small sites. And new features and options allow a central Netview host to remotely operate and collect network alerts from a group of satellite 9370 nodes running Netview Release 2.

Shearson Lehman Brothers, Inc. could use distributed Netview to ensure that a remote IBM Token-Ring network is operational before sending down crucial data to be manipulated locally by users, according to Mervin Adrian, a manager of end-user computing at the firm.

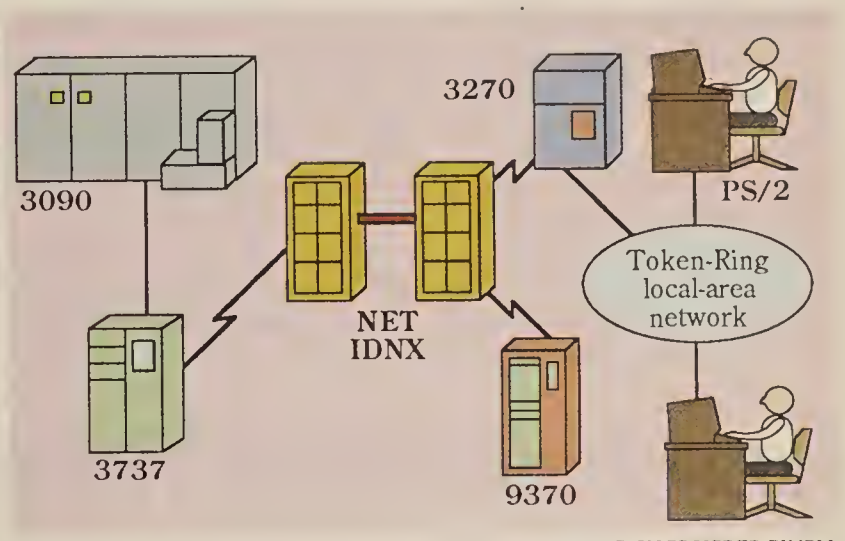
While MIS managers are rejoicing at the appearance of a functional distributed networking system from IBM, the vendor is already in the middle of expanding Netview in still another direction.

"Netview no longer just provides network management: It is now an *information* management system," said Dzubeck, citing new Netview options that provide the ability to download software updates and initialize systems. "Those are data processing operations, and from what I gather, in a year or so IBM will offer software management as well, so that you will be able to repair data base and software faults remotely from a Netview console," he added.

While DEC provides many of the network management capabilities that IBM has just announced, "DEC has been laying back, and they don't have IBM's all-embracing network strategy," Dzubeck said. "IBM projects a godmother image: arms open."

All-Blue links

Agreement with Network Equipment Technologies allows IBM to provide complete range of products in high-speed digital networks



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Storage Tech out of Chapter 11

BY JAMES CONNOLLY
CW STAFF

Storage Technology Corp., the Louisville, Colo.-based peripherals maker that once envisioned itself as a player in the mainframe CPU business, last week emerged from a 32-month term under protection of the Chapter 11 of the Federal Bankruptcy Code having made promises to remain lean and focused.

Court approval of Storage Technology's reorganization came as the firm is preparing for the shipment of one key product family — an IBM 3480-compatible tape drive and automated library system — and is anticipating IBM-driven changes in another key line — higher density IBM 3380-type disk drives with faster channel speeds, according to company officials.

Creditors reportedly will acquire 85% of the company's stock. Storage Technology faced $800 million in debts and is scheduled to pay $132.5 million in cash and issue $285 million in notes. "There have been some customers who still had nagging concerns about doing business with a company under Chapter 11. With those concerns addressed, we see some modicum of improvement in our order rate," said Chairman Ryal R. Poppa.

He and company President Stephen G. Jerritts claimed that few customers have fled since the 1984 Chapter 11 filing. They said Storage Technology had 6,400 customer sites in 1984 and now has 5,900. Jerritts said the escape from Chapter 11 will allow the company to make long-term commitments, such as technology-sharing deals and personnel recruitment.

Keep focus

But what must be avoided, Jerritts said, is what originally got the company in trouble. "It was an attempt to do too many things all at the same time. The company lost focus on what was the core business," he said.

Rather than make mainframes or branch into new areas, Storage Technology will concentrate on disk drives, tape drives and printers, he added.

Poppa said the firm will spend 8% of its revenue on research and development for the foreseeable future. Two major R&D efforts are aimed at system-managed storage software and the next generation of disk drives.

According to Jerritts, Storage Technology will respond if IBM introduces a triple- or quad-density 3380 and 6M byte/sec. channels.

Meanwhile, Jerritts claimed that Storage Technology may expand factory capacity for its 4400 family of tape products. Those products, including the 4400 Automated Cartridge System and 4480 Cartridge Subsystem, were announced in January.

Jerritts said the company has received orders for its entire 1988 output of the 4400 family. The 4480 is installed at two beta-test sites and is due to ship in September. He predicted the sale of 500 library units and 5,000 tape transports in 1988.

Meanwhile, Poppa lashed out at three investors who recently filed a $395 million lawsuit charging Storage Technology with fraud and breach of contract relating to a partnership to develop an optical storage system. Poppa claimed the three did not represent the 266 partners who invested at least $150,000 in the unsuccessful 1981 venture.

Lotus countersues Visicalc plaintiff

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. recently filed a multimillion dollar countersuit against SAPC, Inc., the firm that sued Lotus for allegedly infringing on the copyright of Visicalc, the first microcomputer spreadsheet.

In addition to allegations of fraud and conspiracy, the countersuit claims that Lotus owns all rights to Visicalc based on Lotus's aquisition of Software Arts Products Corp., developer of Visicalc, for $2.4 million in June 1985.

The countersuit will be heard as part of the SAPC suit against Lotus.

Lotus is seeking $20 million in punitive damages on each of three charges and unspecified actual damages.

Conspiracy charges

The countersuit charges SAPC with conspiring to coerce Lotus into allowing the principals of SAPC to "copy the user interface of Lotus's 1-2-3 in its spreadsheet product, Ontio 259," according to a Lotus court document.

Three of SAPC's principals — brothers Julian and Richard Lange and Tracy Robnett Licklider — are also principals in Ontio Computer Products Corp., which has developed a spreadsheet product similiar to 1-2-3 that Ontio reportedly intended to sell for $29.

Before Ontio was able to ship the product, however, Lotus filed suit against Paperback Software International and Mosaic Software, Inc. [CW, April 13] for allegedly "cloning" 1-2-3, prompting Ontio to delay the release of its product.

Earlier this year, SAPC filed suit against Lotus for infringing on the copyright of Visicalc and further charged former Lotus chairman Mitchell D. Kapor with breach of contract. The Lotus response denied SAPC's charges that Kapor violated a nondisclosure agreement with Software Arts when Kapor developed 1-2-3. "This is an attempt to divert attention from the main issues, which are copyright infringement and breach of contract," said Julian Lange, president and chief executive officer of SAPC.

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Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February.(5 issues), March (6 issues), April (5 issues), May (5 issues), June (6 issues), July (5 issues), August (6 issues), September (5 issues), October (5 issues), November (6 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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INSIDE LINES

Could this be the one? Rumors on Wall Street indicate that things between Ashton-Tate and Relational Technology are getting hot and heavy. Ashton-Tate has been in the market for a larger systems data base supplier to broaden its product line. Relational Technology, reportedly up for sale for $100 million, has Ingres, an SQL-driven distributed data base system that would fit well with Ashton-Tate's planned move into larger systems. Keep in mind, however, that Ashton-Tate has had acquisition or merger discussions with virtually every major data base supplier in the U.S.

Long arm of the law. A Department of Justice Antitrust Division investigator confirmed last week that the unit is interviewing Uccel users as part of its normal merger review process under the Hart-Scott-Rodino Act. Meanwhile, a group of systems programmers in Houston is organizing grass-roots opposition to the acquisition of Uccel by Computer Associates and plans to take its case to a Uccel users meeting this week in New Orleans. Members of the Houston group fear Computer Associates' near-monopoly on disk and tape management, job scheduling and data security products.

Must be time. A respected computer dealer says he is expecting IBM to cut the price of its PS/2 Model 30 by up to 25%. IBM is reportedly asking dealers for inventory numbers earlier than usual, a common presage to a price cut, according to the dealer.

Time to pull one out of the hat. Cullinet's 'Magic" development project is expected to produce a code generator to be announced before the end of the year. The generator would produce Cobol applications on a DEC VAX that would be compiled to run on an IBM mainframe. The Magic name will be dropped when it is announced as a commercial product.

Tall tales. The top chairman and chief executive officers of Tallgrass Technologies abruptly departed the troubled company recently as a result of continuing disagreements with other top management and venture capital investors. Gone are cofounder David M. Allen, who was chairman and director of research and development, and Emmett W. Johnson, president and CEO. The two resigned following an argumentative staff meeting on June 11, according to Tallgrass vice-president Steven B. Volk. Volk would not disclose the reasons, but a source close to the company said both were asked to resign as a result of the company's weakened performance in the IBM PC-compatible disk- and tape-drive subsystem market.

Some will wait and some won't. Several large accounts, such as one division of a large California bank, are dumping Lotus's 1-2-3 for multiuser alternatives, such as Supercalc4 from Computer Associates, rather than wait for The Networker, Lotus's network version of 1-2-3, and Symphony. The Networker is now slated for a summer release, but antsy users are beginning to take advantage of two options, according to some dealers. Large accounts committed to Lotus are too scared of prosecution not to buy the requisite number of 1-2-3 disks, but smaller businesses may be more willing to flaunt copyright laws.

One dealer says that some of his clients get two users for every copy of 1-2-3 they buy. These clients use the system and backup disk to validate two hard disks, ending up with four users, he explains.

Our last word on NCC. In hopes of filling the hallways of last week's NCC, the show's sponsors offered to lease some of the surplus thousands of square feet at Chicago's McCormick Place to a software show aimed at programmers and systems analysts. But too few vendors signed up, and the event was canceled on NCC's opening day by Softfair's sponsor, the Goldman Group. "Our decision to cancel Softfair is not a reflection on the NCC whatsoever," said Paul Vincent, president of the Goldman Group. "Softfair is a rather unique event that is closely tied to the hiring plans of area businesses. By holding it in mid-June, we were getting into the summer months, when hiring plans traditionally taper off."

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